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U.S. ARCTIC OPPORTUNITIES

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED FOURTEENTH CONGRESS

FIRST SESSION

TO

EVALUATE OPPORTUNITIES FOR THE UNITED STATES TO BUILD ON ITS STATUS AS AN ARCTIC NATION FOR THE BETTERMENT OF THE NATION AND THOSE WHO LIVE IN THE ARCTIC

MARCH 5, 2015

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TO EVALUATE OPPORTUNITIES FOR THE UNITED STATES TO BUILD ON ITS STATUS AS AN ARCTIC NATION FOR THE BETTERMENT OF THE NATION AND THOSE WHO LIVE IN THE ARCTIC

THURSDAY, MARCH 5, 2015

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The Committee met, pursuant to notice, at 10:06 a.m. in room SD–366, Dirksen Senate Office Building, Hon. Lisa Murkowski, Chairman of the Committee, presiding.

OPENING STATEMENT OF HON. LISA MURKOWSKI, U.S. SENATOR FROM ALASKA

The CHAIRMAN. Good morning. We will convene this morning's hearing on the Arctic.

It is, I think, appropriate that the first ever Arctic hearing scheduled in a full Senate Committee is held on a day that has Washington gripped with anxiety. [Laughter.]

In anticipation of weather. If there's one thing the Arctic knows, it's weather. The people of the Arctic, their lives depend on knowing what will happen with the weather. Being able to predict whether it is safe to go out on the ice, anticipating winter, anticipating the seasons. There is an awareness, I think, of the people of the Arctic about the land and their surroundings that perhaps we don't see in most places in the United States anymore because the people of the North depend on their land.

I have been asked why it should be the Energy Committee that would have a full committee meeting on the Arctic, but I've pointed out that so much of America's Arctic land, of course within Alaska's sizeable borders, is federal land and that's where the nexus is with this Committee.

That's why I wanted to invite the Committee to take a look at what I am describing as the Arctic opportunity that is before America and before the world today. It is economic opportunity. It is scientific opportunity. It is environmental opportunity. National security opportunities, and really opportunities for the nation as a whole from, quite literally, a "top of the world" point of view.

I had an opportunity yesterday evening to give a speech on the Senate Floor, and I had a map of the Arctic and the eight Arctic nations and it was commented on by somebody. They said, "I didn't recognize it. I didn't know what that was a map of."

When you look at planet Earth from above, truly, from the top of the world, it is a remarkable area. Remarkable in its topography. Remarkable in the extent of our oceans.

Also more remarkable because of what we're seeing take place in the Arctic today, a level of movement, a level of commerce, a level of engagement that is absolutely unprecedented. It's this aspect of the Arctic opportunity that gets me excited about what it is that we have to offer as an Arctic nation.

I want to acknowledge a few people who have joined us today that have discovered this is, probably, the only hearing going on in the Senate this morning. It may be that some of you are just lost. [Laughter.] It may be that others of you are here with great purpose as we are.

We have the Ambassador to Iceland, Ambassador Barber, who has joined us. Welcome. It's the first time that I have seen him since we confirmed him, and we're pleased that he is here.

We also have Iceland's Ambassador to the U.S. who has joined us in the group here this morning.

We have many Alaskans who have traveled quite far to be with us, I think, to support not only those who will be testifying this morning, but also a series of other meetings that will be going on throughout the Hill today.

PNWER, the Pacific Northwest Economic Region, is having a North American Arctic Leaders Forum this afternoon in the Russell Office Building, Room 485, beginning at 12:45. I'd like to invite folks to attend if they would so desire. There are those meetings going on and again, we've had a good deal of focus on the Arctic here in the Senate as well.

Now I mentioned that we are an Arctic nation because of Alaska, but truly every state in this union has a stake in the Arctic whether it's from trade with other Arctic nations or research activity. The Arctic touches all 50 states and really needs to be a national priority.

When I was on the Floor yesterday it was Senator Gardner who was sitting in the chair, and I reminded him that in his state of Colorado the percent of total exports from Colorado to the Arctic nations is 30 percent of Colorado's exports. 30.5 percent of Colorado's exports go to Arctic nations. That's from Colorado.

My friend and partner here on the Energy Committee was also on the Floor yesterday, and I reminded him that in Wyoming, again, the numbers are pretty impressive, Wyoming's Arctic exports are 28 percent of Wyoming's total exports.

I guess I should look up Washington while I'm sitting here thumbing through. Washington. We need to up our game here in Washington a little bit. 14 percent of Washington's total exports go to the Arctic.

Maine, and I think my colleague from Maine knows this because I think it's one of the reasons that he has become so engaged in Arctic issues, but in Maine it's 52 percent of Maine's total exports that go to the seven other Arctic nations. So it was not surprising to me that Maine should have a very substantial contingent at the Arctic Circle meeting in Reykjavik back in October, and that was good to see.

Minnesota. You need to know, Senator Franken, that it's just about 30 percent for you as well, 29.9 percent and——

Senator FRANKEN. A lot of that is to Alaska, though. [Laughter.]

The CHAIRMAN. We're going to work on our friends and neighbors to the south of us.

In Hawaii it's a little less than four percent, but I think what happens with Alaska and Hawaii is we export a lot of our Alaskans in this time of year to you for tourism. So I think you appreciate, very well, the full benefit coming out of the Arctic.

I mentioned my colleague from Colorado already sitting at 30 percent, so we welcome him to the Committee as well.

My point in putting these numbers out here is because I think many of us just don't even think about the significance of the Arctic from a trade perspective and what that might mean to us.

On April 25th, just a couple months away, the United States will assume the Chair of the Arctic Council at the ministerial meeting in Iqaluit in the Nunavut territory. I've had the opportunity to attend the past two ministerial meetings. One was with Secretary Clinton when we traveled to Greenland, and then again with Secretary Kerry when we were in Kiruna, Sweden.

It was impressive in both of those ministerials to see the growth in interest in the Arctic by the non-Arctic nations. At the last meeting we had six additional non-Arctic nations that were added as observers to the Arctic Council bringing the number of observer nations to 12 and overall observers to 32. So what is happening is this is not just Arctic nations that are focusing on the Arctic. It is nations from around the world. It is not to be missed that Singapore has had a presence at the Arctic Circle meetings and at the Arctic Council meetings. It is not to be overlooked that the contingent from Great Britain, when we were in Reykjavik at the Arctic Circle meeting, was larger than the delegation from the United States. Great Britain is hardly an Arctic nation.

So it causes you to question what is it that they see that perhaps we're missing here in Alaska? I shouldn't say it. We're not missing it in Alaska. We're missing it in the rest of the lower 48 here.

The Arctic is notable within the international community from an economic perspective as our shipping lanes are opening up, additional areas become accessible for resource development and clearly we see tourism on the rise.

Our neighbors, Russia to the west and Canada to the east, continue with their very determined national plans combined with state investment to develop Arctic resources and advance commerce in the north. Their plans are working to create jobs and economic growth in areas that, I think, we would acknowledge face some extraordinary challenges.

Even non-Arctic nations are embracing the opportunities that are coming with diminished polar sea ice. They're reaping the transit benefits. They're moving ahead with resource exploration and development activities.

We can debate here in the Congress the pros and cons of offshore development in the Arctic, but I am one who believes, very strongly, that we can access our resources. But even if you suggest that we take that off the table, the reality is these activities in the Arctic will continue with or without the United States' involvement.

The maritime activity is only going to increase. What we're seeing happening on the Russian side of the Arctic is going to just accelerate. We're seeing it in Canada. It is everywhere. It is within the entire Arctic except, perhaps, in the U.S. Arctic.

During our Chairmanship of the Arctic Council I am hopeful that the United States will embrace the work of the Arctic Economic Council, recognize its formal connection with the Arctic Council and support its work in order to help those who live in the Arctic to develop their economies and improve their qualities of life.

I think today is a somewhat fitting reminder as we're out in the snow and talking about weather, an element. Unfortunately I think so many people associate the Arctic with just weather. That's all they think about, and it's important that we remind them of the people of the Arctic, the people who have been there for thousands of years, the 4,000,000 people who live in the Arctic.

So as we have these discussions about the challenges that face us, the challenges of climate change and environment, the challenges of moving from a time when it was truly a subsistence lifestyle to one where commerce is opening up. Activities are opening up, and perhaps we lack, not perhaps, but we do lack the infrastructure necessary to be a major participant.

We cannot forget about the people of the north, so I'm pleased today that we will have those who will address those issues as we work together to discuss the Arctic opportunity in front of us.

With that I will turn to my colleague and Ranking Member and one who benefits greatly from the activities in the Arctic because we all jump off from Washington State in heading northward. So with that, I turn to my Ranking Member.

STATEMENT OF HON. MARIA CANTWELL, U.S. SENATOR FROM WASHINGTON

Senator CANTWELL. Well, thank you, Madam Chairman, and thank you for keeping this important and historic hearing on the schedule. And thank you to our constituents who are here to testify.

There is a bit of irony that the backdrop of this hearing is weather when, in fact, the changes of weather conditions demands that the United States come up with an Arctic strategy and implement it. So I'm very grateful that your passion and leadership prevailed here today.

I think the Arctic is something we can find significant common ground on. The United States Arctic strategy is tremendously important to both the economies of Washington and Alaska and, as we've heard from many of our colleagues here on the Committee, it is critically important to the United States of America as well. I think that we will hear that from our witnesses today.

I believe we can agree on the fact that our Coast Guard needs the tools and infrastructure required to operate in the Arctic which means developing a polar ice breaker fleet.

We must have strategic investments in Arctic science which will help us understand the impacts of climate change on Arctic communities but will also better inform our strategies for dealing with everything from rescue operations to potential oil spills.

I think we can agree that the United States must ratify the Law of the Sea Treaty which clarifies the rights and responsibilities of nations on our oceans.

The Arctic already contributes a great deal to the American economy, and we must have a seat at the table. The Chinese and the Russians are already aggressive in their resource development in the Arctic area, and as our climate continues to change, the economic importance of the Arctic will only continue to grow in the years ahead.

This year the United States assumes the rotating Chair of the Arctic Council. In this capacity we have a great opportunity to draw Arctic nations closer together to address a wide range of issues. The U.S. efforts, hopefully, will prioritize important efforts in addressing climate change, increasing regional cooperation and facilitating new and reliable shipping routes.

On January 21st President Obama issued an executive order to improve coordination and implementation of the United States Arctic strategy, and this order created the Arctic Executive Steering Committee, chaired by the Office of Science and Technology Policy at the White House. The Steering Committee will help to increase coordination, reduce duplication, and address any potential gaps in implementation. In my view, the Obama Administration is pursuing an Arctic strategy not just on paper, but they have to have significant actions proportional to the challenges and opportunities that we face here with the Arctic.

That's why I'm so pleased that Admiral Papp is here today, because he fully appreciates the role the Coast Guard plays in the Arctic and will play in the future. As we evaluate opportunities and challenges that we face in the Arctic, we need to make sure the Coast Guard has the adequate resources to meet those missions and do so safely.

Admiral Papp, given your role in signing the Coast Guard Arctic Strategy in 2013 when you served as the 24th Commandant, you bring a unique viewpoint on these issues. I look forward to hearing your perspective this morning on your role as the Special Representative for the Arctic.

While all ice breaking operations in the Arctic have been delegated to the Coast Guard, it is clear that we have not yet provided these men and women with the resources to meet this mission. According to a 2010 study, the Coast Guard determined that it either needs three heavy or three medium ice breakers to fill its statutory obligations or six heavy and four medium ice breakers to both meet its statutory obligations and the requirements established under the Naval operations concept. Yet today the Coast Guard only has two ice breakers in operation, one heavy and one medium, and the medium vessel, the Healy, is primarily a research vessel.

Madam Chair, I know this isn't the Commerce Committee where we often discuss these issues, but it is very important as we discuss our Arctic strategy that the United States of America understands it needs to make an investment in ice breakers. These issues of lack of resources are particularly troubling when we consider that Russia currently has 29 operating ice breakers and is in the process of building eight more. I found out this morning even India is building an ice breaker. According to a report for the Cen-

ter of American Progress released this morning, "Without this decisive action to fund and build a new heavy ice breaker fleet for the U.S. Coast Guard, the United States puts its environmental and national security in harm's way."

The Coast Guard is already spread too thin, and earlier this year the Polar Star broke through ice to deliver supplies to the American base in Antarctica. A commercial fishing vessel got stuck in ice nearly 900 miles away. The Polar Star launched an international rescue mission traveling 860 miles, 150 miles required breaking thick ice in the Antarctic ice. When all was said and done, our Coast Guard rescued 26 people.

I'm very proud of our Coast Guard, especially the crew that calls Seattle home, and I'm concerned that we only have one heavy ice breaker. What if the Polar Star too had been stuck? So as the Commandant, Admiral Zukunft, said in his State of the Coast Guard address last week, "There is no one to rescue the rescuer." We need to provide the Coast Guard with more resources, and that means more ice breakers. I'm sure ice breakers are one of the topics we'll hear about from a number of our witnesses.

I'm pleased to have Dr. Bitz, from the University of Washington, here today to talk about the impacts of climate change as we will discuss we're seeing tremendous impacts on the Arctic region. And this is something we need to address in a comprehensive, regional policy.

It's also worth noting that last October Defense Secretary Hagel referred to climate change as a "threat multiplier." These threat impacts include impacts to property from sea level rises and erosion, and access to natural resources, including our fisheries. Further extreme weather can impact our military readiness and continue to stretch already limited resources.

Warming has serious implications for America's national security in the Arctic, and this impact is especially acute because climate change is affecting the Arctic region twice as fast as the continental United States. Over 5.4 million miles of the Arctic Sea melted between March and September 2012 and the level of Arctic ice measured in January of 2015 was the lowest amount for the month of January in history.

We've already seen significant ways in which climate change is altering the life of the Arctic. Juvenile salmon populations have decreased as they have lost access to traditional food sources under the Bering Sea coast. I'm sure the Chair could name many things that are happening, everything from affecting Alaska villages to coastal flooding and erosion to threats to homes.

But it is also important that we note the impacts of melting ice in the Arctic also have broad, national economic implications. According to a recent report by the Natural Resources Defense Council, melting ice in the Arctic will have a severe impact on agriculture in the continental United States. Kansas, for example, will be four degrees warmer in the winter without Arctic ice, which normally generates cold air masses that slide southward. Warmer winters are bad for wheat farmers who need freezing temperatures to grow wheat. In the summer warmer days would rob Kansas soil of 10 percent of its moisture for drying out valuable farmland.

My point to our colleagues is that this affects all of us, and the fate of the Arctic ice will have broad economic implications in the lower 48.

I want to talk for a second just about the importance here of trade in the economy, because I know we do have guests from all over. They've already seen how important the Arctic is for this. In the coming years economic activity in the Arctic is poised to increase substantially. This will have a dramatic downstream impact on Pacific ports like Seattle and Tacoma. The economy of my home state and Alaska too is already deeply interwoven.

According to a recent study by the McDowell Group, Alaska-related jobs in the Puget Sound area increased by nine percent in the last ten years. 3.4 million tons of cargo moves between our states every year, and an increase in commerce in the Arctic will certainly provide new economic opportunities to both our states.

It is also important that we assess how the melting ice in the Arctic would have a significant impact on global trade. The opening of the Northwest Passage, for example, would reduce the amount of time it would take to travel from Korea and the Netherlands by ten days compared to the route through the Suez Canal. A 2009 report from the Arctic Council estimates that the northern sea route would offer an overall estimated savings of 35 to 60 percent for ships traveling from East Asia to Europe. It would also allow ships to circumvent regional conflicts that are at risk of piracy, everything from the African Coast or Malaysia.

It is also important that we not lose track of the significant challenges this economic opportunity will also present. Although melting ice sheets will increase traffic, there still will be significant ice cover, severe storms, minimal maritime and weather data to assist vessels transiting those routes. That is why we all need to work together on a strategic plan in the Arctic sciences, tools and infrastructure.

One of the key steps in addressing, I believe, our Arctic activities is also in ratifying the Law of the Sea under the United Nations convention. I know my colleague knows well this issue and all the challenges that we have faced in trying to address this here in the United States Senate, but I just want to point out that President George W. Bush and President Obama and Secretaries of State and Defense have all supported this effort including many, many people in the private sector, everyone from shippers to fishing businesses. I think it's an important issue we need to try to engage our colleagues on.

So the Arctic is certainly a region of great economic importance to our country, and at the same time we must work to confront the climate change issues that are posing a threat to the region. I look forward to hearing from many of the witnesses.

Again, Madam Chair, I really do want to complement you on your perseverance in making sure that we had this historic Arctic hearing today.

The CHAIRMAN. Thank you, Senator Cantwell. It will be just the first of many, I'm sure.

Along with Senator King, I have invited each of our colleagues to join us as part of the Arctic Caucus. We've got a lot of caucuses around here but, I think, it is something that we will use as a

means of outreach and education and collaboration on some of these issues that you have raised in your comments.

I appreciate your comments, particularly about the issue of ice breakers and our lack of capacity in that area. While there are many things that can be used as a barometer for progress that we're making, if you can't move it makes it tough to do much of anything. And as a nation we are woefully behind.

While we do have the Polar Star, the fact of the matter is that the Polar Star is on contract for the next five years down in Antarctica. When she's not down there, she's going to be being patched up because of being banged around in the ice down there. So we're not going to see her in our northern waters for five years.

And then you think, well, okay, we get her after that. She's got a youthful life expectancy of between six to eight years now. So when you keep in mind that it takes at least ten years to build a new ice breaker and it takes about $1 billion we needed to get started yesterday. So I look forward to your commitment in working on that.

Let's stop talking and listen to those who truly get up every day to focus on the issues of the Arctic.

I will welcome each of you with introductions and then we will start with your comments. I am particularly pleased this morning that we have Admiral Papp joining the Committee. I know, Admiral, that you rearranged your schedule to be here, and I greatly, greatly appreciate that. I know where your heart is on these issues. We've had an opportunity to travel together.

Admiral Papp has been with the Coast Guard for his entire career. He served with great distinction as the 24th Commandant of the U.S. Coast Guard, and he was a career Cutterman serving on six Coast Guard Cutters. He began his Coast Guard career in Adak, and it is a wonderful story for those of us who have an appreciation of the remoteness and some of the unique attributes of being out in Adak with a new bride. But the good news story for Admiral Papp and his wife, Linda, is that journey that began in Adak continues after many decades of a wonderful relationship. He's got a fabulous family, and I have been pleased to be able to make their acquaintance as well.

Admiral Papp became the State Department's Special Representative for the Arctic in July of 2014. He has a considerable task in front of him as he works to really coordinate and facilitate so much of what is happening whether it's through the State Department, the White House, the legislative branch, or working and communicating with local governments at all levels. I truly appreciate the leadership that Admiral Papp has presented.

Next to Admiral Papp is Representative Bob Herron. He is a member of Alaska's State House of Representatives, and he is cochair of the Alaska Arctic Policy Commission. He hails from Bethel. He was elected to the House back in 2008, but his passion for all things Arctic is manifested in all of what he does. I appreciate you being here and for what you and Senator McGuire have done with the Arctic Policy Commission. It has been a considerable effort and is greatly appreciated and respected.

Senator McGuire, welcome to you. Senator McGuire is also a member of the Alaska legislature, serving in the Alaska State Sen-

ate. She's co-chair, again, of the Alaska Arctic Policy Commission, and she was first elected to the State Senate back in 2006.

She served in the House of Representatives, and I'm pleased to be able to say that we were able to serve together in our legislature. She has done a wonderful job for us. She is also, along with Representative Herron, co-chair of the Pacific Northwest Economic Region Arctic Caucus. Again, that meeting will be going on this afternoon.

In the middle we have the Honorable Mayor Charlotte Brower, who is the Mayor of the North Slope Borough. The Borough encompasses an area of nearly 95,000 miles. I'm told, Mayor Brower, that's about the size of Wyoming. And you are mayor of this amazing area. Over 70 percent of the borough's residents, there's about 7,500 residents up there, about 70 percent are Inupiat Eskimo.

Charlotte is the first woman to serve as mayor. She was recently reelected to another three year term. She's the wife of a whaling captain and has a wonderful family there in Barrow, Alaska. Welcome and we appreciate your leadership, Mayor Brower.

Dr. Cecilia Bitz, welcome to the Committee. Dr. Bitz is a professor in the Atmospheric Sciences Department, an affiliate physicist for the Polar Science Center and part of the program on climate change, all at the University of Washington. We welcome you to the Committee as well.

Her work includes research into the role of ice in the climate system and high latitude climate and climate change. So we'll look forward to your comments.

Rounding out the panel we have Mr. Patrick Arnold. Mr. Arnold is the Director of Operations and Business Development at the Maine Port Authority.

Again, I think it's significant that the two states that book end the country, Maine and Alaska, are significantly represented as we discuss these issues of Arctic policy.

Thank you to all of you for coming here, many of you flying great distances to be here, rearranging your schedules and coming through the Arctic weather.

With that, Admiral Papp, if we can begin with you and thank you again, for your service to our country in so many different ways.

STATEMENT OF ADMIRAL ROBERT J. PAPP, JR., SPECIAL REPRESENTATIVE FOR THE ARCTIC, U.S. DEPARTMENT OF STATE

Admiral PAPP. Thanks, Madam Chairman, and let me say, congratulations. It's the first time for me to see you in the Chair. And as you are a member of our Coast Guard family as well, due to your father's service, we're really proud of you to be there.

And Senator Cantwell, another long term friend of the Coast Guard and to me personally. She substituted for Senator Rockefeller five years ago to Chair my confirmation hearing, so I'm indebted to her for that.

To the rest of the members, good morning to all of you. Also good morning to my good friends that I've been able to make over the years of visiting Alaska, Representative Herron, Senator McGuire and Mayor Brower. I've spent a lot of time with them, not only over

the last six or seven months in this job, but also over the last four years.

As you noted I started my career in Alaska, and it taught me many lessons that lasted me throughout my entire career.

First of all the tyranny of time and distance in Alaska, the severity of the weather, but also the beauty and the ice and the challenges that people face while they're living and working in that environment.

It also laid down a marker for me because then visiting almost four decades later as the Commandant of the Coast Guard, I saw firsthand the changes that are occurring in that very sensitive and beautiful environment. So my interest in Alaska, in particular, and in the Arctic, more broadly, has been for about four decades now. I'm very proud and privileged to be the first United States Special Representative for the Arctic.

I don't have a long statement here in the interest of time. I want to get to the questions and answers just like you do, so I just wanted to point out a couple of things.

Our program that we've developed for our Chairmanship of the Arctic Council is probably the most aggressive and ambitious that's ever been proposed by any one of the Arctic countries. It was well underway before I came into the job nearly seven months ago. My job, when coming into the State Department, was more to organize it and to market it and put it in a form that we could bring it forward.

Much of that depended upon getting input from our friends and neighbors in Alaska, so I immediately went to Alaska for my first visit in this job. I spent a week up there talking to the entire breadth of constituency groups, came back, we revised our program slightly, gave it to Secretary Kerry for tentative approval, and then made a second visit to Alaska to do some more listening sessions and find out where we might improve our program.

We came back, prepared the program and then started our efforts towards advertising and bringing it to the public. I spoke to a number of groups both environmental, security and others then, of course, traveled to Reykjavik, Iceland.

I would say also, good morning to Ambassador Barber and Ambassador Gerhard, good friends of ours and my first international speaking engagement was with you in Reykjavik at the Arctic Circle.

Once again, refining our program, getting more input from constituents and also the entire federal family, and then coming and taking it to Europe. Just three weeks ago I returned from two weeks in Europe going to Denmark, Sweden, Norway, Finland and to Russia to discuss, at the highest levels in their governments, the implications and the agreement on our program for the Arctic Council.

So I wanted to give you the feedback on what I received across the board on our program for the Arctic Council.

First and foremost we have, when I speak to environmental groups, they say, well you got the climate issues right, but you're a little strong on security. When I talk to security groups they say, well, you got the security stuff right, but you're a little strong on

climate. So I suspect we hit the sweet spot there in terms of balance in our program.

The second comment I get, particularly from the other seven countries, is that's a very ambitious program. Are you sure we're not taking on too much?

The only person that contradicts that is Secretary Kerry. He always asks me, are we doing enough? Can we do more? So once again I think we've found a sweet spot there.

There are complaints about economic development and that the United States might not be committed to the Arctic Economic Council. I think that's a misperception, and I look forward to answering questions about that.

The next question we get is are we going to cooperate with Russia? And that was part of the reason for me going to Moscow was to make sure that we can keep the lines of communication open with Russia and reassure the other Arctic countries that those lines of communication will remain open for the success of the Arctic Council.

Then the final thing is the other countries are excited about the United States' leadership. They will admit that this is a very ambitious program, but they're excited because we're showing leadership. Leaders set high goals, and once you set those goals you have to look for measureable results.

What we're trying to do with the Arctic Council is to operationalize the Arctic Council, get it out of just policy decisions and start taking some actions. For instance, implementing the search and rescue agreement. Implementing the pollution response agreement, and showing and identifying where our strengths and weaknesses are.

Under U.S. leadership the only question that I have coming up from the other countries is, you know, we really like what you're doing. We're excited, but is the United States really committed? We don't sense that you're fully committed to the Arctic yet.

And then what it always reverts to when you talk to either the other countries or our friends in Alaska, they say its resources. When is the United States going to commit resources? When are you going to spend the first dollar on building a new ice breaker?

That's not within my purview at the State Department, and it's not within the purview of the Arctic Council to run domestic issues for the United States; however, our public diplomacy program, we hope, will bring attention to the Arctic and to Alaska and hopefully lead to those considerations.

Madam Chair, I look forward to your questions.

[The prepared statement of Admiral Papp follows:]

Statement of
Admiral Robert J. Papp, Jr.
Special Representative for the Arctic
U.S. Department of State

Before the Committee on Energy and Natural Resources
U.S. Senate
March 5, 2015

Introduction

Good afternoon Chairman Murkowski, Ranking Member Cantwell, and other Members of the Committee. I appreciate the opportunity to appear before you today to discuss how the Department of State is working to build on our status as an Arctic nation for the betterment of the nation and those that live in the Arctic.

Recognizing the importance of the Arctic, and in line with the President's commitment to elevate Arctic issues in our nation's foreign policy, particularly as the United States prepares to chair the Arctic Council in 2015, Secretary Kerry appointed me as the Special Representative for the Arctic last July. My broad charge is to lead our nation's efforts to promote our priorities and advance U.S. policy in the Arctic region, a region in which we have vital national interests.

It is important to note at the outset that the United States is operating in a difficult international environment today. Russia's continued aggressive actions in Ukraine and occupation and attempted annexation of Crimea are an affront to the rules-based international system. The United States has joined the international community – including other Arctic states – in opposing Russia's violation of Ukraine's territorial integrity, and in imposing costs on Russia for its actions.

At the same time, we continue to work with Russia on global issues like those in the Arctic in which it also has national interests. As we do so, we remain cognizant of how significant changes in the Arctic are creating new challenges and opportunities for the United States and the other Arctic nations. A rapidly warming Arctic climate threatens traditional ways of life while affording new shipping routes and increased opportunities for trade, allows for increased oil and gas exploration while risking environmental

pollution, and attracts tourism while communities tackle food security, health concerns, and suicide. The challenge of charting a path toward a sustainable future in the Arctic is not lost on me. As directed by the President in the Executive Order on the Arctic, the federal interagency community is committed to working within our capacities to improve the future of this region.

International Governance

United States engagement with international partners in this region is extremely important, as governance of the Arctic region falls primarily to the United States and the seven other Arctic States: Canada, Iceland, Denmark (through Greenland), Finland, Russia, Norway, and Sweden. International cooperation takes place in multiple fora, such as the Arctic Council, the International Maritime Organization, and the new Arctic Coast Guard Forum. Each of these serves a purpose to advance specific priorities and affords the opportunity to engage with appropriate delegations. By and large, our international Arctic engagement takes place through the Arctic Council, the preeminent forum for international diplomacy on Arctic matters.

Unfortunately, our engagement with Russia, in particular on Arctic issues, is complicated by Russia's aggressive action in Ukraine and occupation of Crimea. But we have worked with Russia on Arctic issues during past political crises and are maintaining activities related to protecting the Arctic environment, ensuring maritime safety, including search and rescue, and enforcing laws. We also continue to work with Russia in multilateral fora, including under the auspices of the Arctic Council, and our allies are following similar policies.

We are, of course, aware that the United States is an Arctic nation because of Alaska. We recognize that decisions taken on Arctic issues at the international level can have direct consequences for the State of Alaska and for its people, particularly Alaska Natives. We therefore remain committed to engaging closely with the State of Alaska and its people as we undertake Arctic diplomacy.

The Arctic Council

In promoting our environmental and other national interests in the Arctic

region and strengthening international cooperation, we use the Arctic Council as the primary mechanism for multilateral engagement. The Arctic Council is a high-level intergovernmental forum of the eight Arctic States and the Arctic indigenous peoples. Created in 1996 to provide a means for promoting international cooperation, coordination and interaction on common Arctic issues, its founding document focuses the Council's work on environmental protection and sustainable development, but its mandate is not necessarily limited to these areas. The one area explicitly excluded from the Council's mandate is "military security"[1]; thus, the Council does not handle military issues or military-to-military cooperation among the Arctic States.

As the challenges and opportunities facing the Arctic have grown in volume and complexity, the Council's workload has increased dramatically in recent years. Currently, the Council has six working groups composed of national-level representatives of the Arctic States. The working groups cover a broad range of issues such as human health, climate change impacts, biological diversity, emergency response, and protection of the Arctic marine environment, to name a few. In addition to the working groups, the Council periodically mandates task forces and expert groups, also composed of national-level Arctic State representatives, for limited periods to address specific, cross-cutting issues. Each Arctic State appoints a Senior Arctic Official to run the Council's day-to-day operations. The Council meets at the Ministerial level once every two years at the conclusion of the chairmanship, and most Arctic States send their foreign minister. Each Arctic State assumes the chairmanship of the Council for a two-year period during which the chairing State hosts numerous meetings and other diplomatic events.

The United States has led or co-led many of the Council's important initiatives including the 2004 Arctic Climate Impact Assessment, the 2008 Arctic Oil and Gas Assessment, and the 2009 Arctic Marine Shipping Assessment. In addition, work under the auspices of the Arctic Council has resulted in two agreements among the Arctic States that are in legally binding form: one on search and rescue cooperation, signed in 2011, and the other on marine oil pollution preparedness and response, signed in 2013. Over the past eighteen years, the Council's cutting edge work has paved the

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1 [1] Declaration on the Establishment of the Arctic Council: Joint Communique of the Governments of the Arctic Countries on the Establishment of the Arctic Council. Ottawa, Canada. September 19, 1996.

way for international cooperation to address shared environmental challenges. No other body is doing work of such high caliber on the international issues we face in the Arctic. Our collaboration with the other seven Arctic States has worked well over the life of the Council and we could not have done this work without them.

U.S. Chairmanship

The United States will assume the rotating two-year chairmanship of the Arctic Council in April 2015. We have developed a robust proposed work program for our chairmanship in line with the priorities laid out in the National Strategy for the Arctic Region and its subsequent Implementation Plan. We continue to hone the proposed program through regular meetings with federal interagency counterparts, the State of Alaska, Alaska Native groups, NGOs and other interested stakeholders. In my capacity as the Special Representative for the Arctic, I have traveled twice to Alaska to consult with local experts and residents. I heard positive feedback on our proposed chairmanship program, as well as concerns about some aspects. The State Department has also received feedback from numerous stakeholders, mostly supportive. Where we have heard concerns, we are discussing ways forward. We are also actively consulting with our fellow Arctic Council members and "Permanent Participants" (representatives of Arctic indigenous groups) so that we can reach agreement on our chairmanship program by the time we assume the Chairmanship in April. The Council operates on the basis of consensus, so we need the support of all the Arctic States.

The United States is assuming the chair of the Arctic Council at a critical time. The Arctic Council has proven itself to be an effective and cooperative forum in which the eight Arctic States and Permanent Participants can come together to develop effective ways for managing this relatively pristine region of the world. We would like to continue strengthening the Arctic Council by moving it toward more practical, on-the-ground activities that will improve the environment and contribute to sustainable economic development for the people who live there.

The areas we are proposing to highlight during the U.S. Chairmanship are:

- Arctic Ocean Safety, Security, and Stewardship
- Improving Economic and Living Conditions

- Addressing the Impacts of Climate Change

Climate-related changes in the Arctic are already profoundly impacting the United States and the rest of the planet. Reductions in sea ice are positioning the Arctic Ocean to be increasingly accessible in the short and long terms. The Arctic Ocean is becoming more navigable as evidenced by an increase in shipping through the Northern Sea Route over Russia. We have also seen an increase in shipping through the Bering Strait, a potential future chokepoint for trans-Arctic shipping traffic. In addition, the ice-diminished maritime environment is attracting resource exploration in areas previously inaccessible.

We plan to prioritize collaborative search and rescue and oil pollution preparedness and response exercises, ideally within the new Arctic Coast Guard Forum. To ensure that future maritime development avoids areas of ecological and cultural significance, we will prioritize the Arctic Council's on-going development of a network of existing marine protected areas, and possibly identify new marine protected areas. To address other challenges in the Arctic Ocean, we are looking to improve international coordination through a regional seas program similar to regional seas programs in other oceans. In the coming months we will work closely with domestic and international stakeholders to determine the specific nature and direction of this initiative.

During the U.S. chairmanship, we will strive to bring tangible benefits to communities across the Arctic. In particular, we will seek to assist remote Arctic communities with adapting to the rapid changes that are altering traditional ways of life. The U.S. aims to increase energy and water security for remote Arctic communities by working toward better and more secure access to renewable energy sources, improving water and sanitation access, and reducing dependence on diesel generators while at the same time reducing emissions of black carbon in the Arctic. The U.S. also plans to continue advancing suicide intervention and awareness programs to reverse disturbing trends that disproportionately affect Arctic communities. Suicide rates across the entire Arctic region are much higher than in most other areas of the world. Men and boys are particularly at risk.

In addition, as indicated in the Implementation Plan for the National Strategy for the Arctic Region, the U.S. hopes to see an Arctic telecommunications infrastructure assessment that would serve as the basis

for the eventual build-out of the telecommunications infrastructure necessary to support ever-increasing human activity throughout the Arctic region. Building telecommunications infrastructure across the Arctic will provide critical support to navigation, offshore development activities, search and rescue operations, environmental and humanitarian emergencies, and will make online tools for Arctic communities, such as telemedicine, education, and adaptation, more accessible and useful.

Our chairmanship will continue the on-going high-level focus on the impacts of climate change, especially the drivers of change and the ways and means of addressing on-the-ground impacts. To minimize the prospect of irreparable long-term harm to the Arctic – and the globe, as changes in the Arctic reverberate around the world – we need to take sustained, quantifiable measures to reduce greenhouse gas emissions and increase community resilience and preparedness. During the last Administration, the United States initiated efforts within the Arctic Council to mitigate so-called "short-lived climate pollutants" such as black carbon and methane that have direct impacts in the Arctic. During our chairmanship, we will press for full implementation of a new, voluntary arrangement to be completed by the end of the current chairmanship that will include development of national black carbon emission inventories, national reporting on domestic mitigation efforts, and data collection efforts.

Another path forward is to examine key industrial practices, such as oil and gas flaring, to share best practices, policies and technologies among technical experts, industry and policymakers. The Department of State aims to lead the Arctic Council through an assessment of how we can improve emissions estimates of black carbon and other air pollutants from gas flares. We hope to be joined by other Arctic States in efforts that build climate resilience into national policies and promote community- and ecosystem-based climate adaptation. Without the natural sea ice barrier, coastal communities in Alaska are now battered by storm events that damage the permafrost upon which critical infrastructure depends, leaving houses and other buildings literally falling into the Bering Sea. Policymakers and communities need decision-informing tools to enable prioritization of adaptation efforts and more climate-resilient decision-making.

Resource Exploration

Diminishing Arctic Ocean sea ice is unlocking access to significant energy resources and other potentially lucrative natural resources. Estimates of technically recoverable conventional oil and gas resources north of the Arctic Circle include 13 percent of the world's undiscovered oil and 30 percent of the world's undiscovered gas deposits, as well as vast quantities of mineral resources, including rare earth elements, iron ore, and nickel. Improvements in drilling technology are expected to lead to offshore oil and gas development in the Arctic that is more economically and technologically feasible. That said, the Arctic is now and will remain long into the future an extremely challenging environment in which to operate, and there is limited industry expertise.

The Department of State aims to promote good governance and environmentally responsible development of all energy resources – oil and gas production, as well as clean, renewable energy –with an emphasis on consistency among Arctic States and environmental sustainability. We are committed to implementing international agreements to reduce the risk of marine oil pollution, conducting international joint oil spill response exercises, and increasing global capabilities for preparedness and response to oil pollution incidents in the Arctic. Collaborating closely with domestic agencies, it is the aim of the Department of State to work with stakeholders, industry, and the other Arctic States to understand the energy resource base, develop and implement best practices, and share knowledge and experience.

While we acknowledge the importance of fossil fuels, there is tremendous potential for renewable energy in the region. Development of renewable energy resources including solar, wind, geothermal, and tidal, has been slow, but there are many dedicated people across the Arctic, including in Alaska, working to make energy generation sustainable and healthy. We will continue to work with stakeholders to promote a regional focus on addressing barriers to renewable energy development, with the goal of improving the quality of life in Arctic communities and addressing climate impacts.

Balancing Economic Development and Environmental Stewardship

The Arctic region is a biologically diverse place where people, animals and plants have thrived for thousands of years. The impact of climate change, especially sea ice reduction, is already threatening certain species as well as the local communities that subsist on them. Our goal is to protect the

environment for the people who live there and to conserve the natural resources in the face of ever-expanding human activity that will surely have impacts. For example, offshore oil and gas development, shipping, tourism and perhaps commercial fishing in the future will undoubtedly alter the environment. We believe we can manage the negative impacts so that Arctic States may mutually benefit from the Arctic's natural resource wealth and maintain a clean, healthy environment.

We want the new Arctic Economic Council to encourage positive collaborative relationships with the industries working in the region now and in the future so we maximize the sustainable development potential in the region. And we must keep working collaboratively with the other Arctic States, including Russia. Throughout the Cold War, our domestic agencies such as EPA, the Fish and Wildlife Service, NOAA and the Coast Guard worked closely with their Russian counterparts and did a great deal of important work to improve the Russian environment and its legacy pollution problems.

Indeed, the Arctic Council was born at the conclusion of the Cold War and has been instrumental in bringing Russia into the family of nations to help its enormous environmental challenges. We must continue to make progress in protecting the environment and keeping positive relationships alive in the Arctic now more than ever as human activity increases and the probability of environmental problems increases with it. What happens in the Russian environment can directly affect the United States, and Alaska in particular, so it is in our national interest to continue to advance our priorities through engagement with Russia in the Arctic Council now and in the future.

Arctic Fisheries

Although currently there are no commercial fisheries of consequence in the high seas area of the Arctic Ocean, it is reasonable to expect that, with diminishing sea ice and the possible migration of species, commercial fisheries are possible in the foreseeable future.

Scientific information about the Arctic's marine biodiversity is limited and even less is understood about the extent to which climate change and increasing industrial and other human activities in the Arctic may threaten marine ecosystems and resources, including fisheries. In light of this, in

2009 the United States took the precautionary step of prohibiting commercial fishing in its own exclusive economic zone (EEZ) north of the Bering Strait until there is a better scientific foundation for a sound fisheries management regime. Other Arctic countries have taken similar steps, most recently Canada.

In our view, this same approach should apply with respect to fisheries in the high seas area of the central Arctic Ocean. In the high seas area, with the exception of the small wedge that is within the area covered by the North East Atlantic Fisheries Commission, there is no governance regime in place by any fisheries management organization or arrangement. Thus, we have been working with other governments towards an understanding that commercial fishing should occur there only on the basis of adequate scientific information on which to base proper fisheries management and after an international fisheries management regime is in place.

To date, we have been conducting discussions with Canada, the Kingdom of Denmark in respect of Greenland, Norway, and the Russian Federation – the four other coastal States with EEZ's bordering the high seas area of the Arctic Ocean – toward a legally binding agreement to prevent unregulated commercial fishing in the high seas area. Our intention is to bring the European Union and other interested major fishing nations into these discussions soon.

The arrangement we envision is that States will commit that their flag vessels will not be authorized to undertake commercial fishing on the Arctic Ocean high seas until one or more fisheries management organizations or arrangements is in place to manage such fishing in accordance with modern international standards.

Arctic Ocean – ECS and Maritime Boundaries

Efforts by the United States and other Arctic countries to define their continental shelf in the Arctic Ocean are sometimes described as a "race for resources" or "competing territorial claims." Such hyperbole is inaccurate and unhelpful.

There are two underlying issues here: delineating the continental shelf beyond 200 nautical miles (commonly called the extended continental shelf or ECS); and delimiting the maritime boundaries where ECS may overlap

for one or more neighboring States. In other words, first, what is the extent, or outer limit, of a country's ECS and, second, how do neighboring countries divide that ECS when it overlaps.

Contrary to many media reports, there is no race for resources or land grab underway in the Arctic. The Arctic coastal States are proceeding in an orderly manner to define their continental shelf limits according to the provisions set out in the Law of the Sea Convention.

Determining the extent of a State's ECS is not simply a matter of measuring a specified distance from its shore. To determine whether a State meets the criteria in the Convention, it must collect data from ships that describe the depth, shape, and geophysical characteristics of the seabed and sub-sea floor. That data is then analyzed in order to determine a set of coordinates of the seaward extent of the ECS.

Each of the five States surrounding the Arctic Ocean–Russia, Canada, Norway, Denmark (via Greenland), and the United States – has an ECS. All five States also have ECS outside of the Arctic Ocean, but the Arctic has received a disproportionate amount of public attention.

The United States, like the other Arctic States, has made significant progress in determining its ECS. All of the necessary data collection to delineate the U.S. ECS in the Arctic Ocean has been completed through tremendous efforts by the Coast Guard, NOAA, USGS, and the Department of State. Nine successful cruises were completed in the Arctic Ocean over twelve years and four of those missions were jointly conducted with Canada.

Last year the Office of Ocean and Polar Affairs at the Department of State established the ECS Project Office at a NOAA facility in Boulder, Colorado. This office is dedicated to completing the data analysis and documentation necessary to establish the limits of the U.S. ECS in the Arctic and other U.S. ECS areas, such as the Bering Sea, Atlantic Ocean, and the Gulf of Mexico.

While the United States has a significant amount of ECS in the Arctic, as a non-party to the Law of the Sea Convention, the U.S. is at a significant disadvantage relative to the other Arctic Ocean coastal States. Those States are parties to the Convention, and are well along the path to obtaining legal certainty and international recognition of their Arctic ECS.

Becoming a Party to the Law of the Sea Convention would allow the United

States to fully secure its rights to the continental shelf off the coast of Alaska, which is likely to extend out to more than 600 nm. However, only as a Party would we put our rights on the firmest legal footing and have access to the Convention's procedure that would maximize legal certainty and international recognition of the U.S. continental shelf that extends beyond 200 nm. U.S. accession is a matter of geostrategic importance in the Arctic (where all other Arctic nations, including Russia, are Parties and can fully secure their continental shelf rights). The Administration remains committed to acceding to the LOS Convention as a high priority.

Overlapping continental shelves are inevitable in the Arctic Ocean, as elsewhere. Where boundaries have not yet been concluded, neighboring States will work together on a bilateral basis to try to reach agreement in what are often complex and time-consuming processes. It is important to keep in mind this is not a question of first-come, first-served.

We have two maritime boundaries in the Arctic, one with Russia and one with Canada. The United States and the Soviet Union signed a maritime boundary agreement in 1990. Although this agreement is applied only provisionally pending its entry in force, Russia has respected this maritime boundary, and has not defined an ECS in any areas on the U.S. side of the boundary. The United States is taking the same approach.

Canada and the United States have yet to agree to a maritime boundary that would divide our overlapping ECS. We have made this a key objective for implementation of our National Strategy for the Arctic Region and this will be an important future effort. Nonetheless, we have managed to work together to collect mutually beneficial data necessary to define our respective ECS areas.

Conclusion

The Arctic Region presents enormous and growing geostrategic, economic, environmental, and national security implications for the United States. We are at a pivotal point in history as the Arctic is rapidly changing and we prepare to assume the Chairmanship of the Arctic Council. We look forward to advancing national priorities, pursuing responsible stewardship, and strengthening international cooperation in the Arctic Council and other fora.

Again, thank you for the opportunity to testify today. I look forward to your questions.

The CHAIRMAN. Thank you, Admiral Papp. I greatly appreciate, again, your leadership and your willingness to be here with us this morning.

Representative Herron.

STATEMENT OF HON. BOB HERRON, REPRESENTATIVE, ALASKA STATE LEGISLATURE

Mr. HERRON. Yes. Good morning, Madam Chair and to all the other members of this Committee.

We're going to explain to you this morning a little bit about the Alaska Arctic Policy Commission's report, and I'll take the implementation plan and the House bill that my colleagues in the Alaska Senate will vote on next week.

The implementation plan and the bill follow four priority lines of effort. Promoting economic and resource development. Addressing the infrastructure and response capacity in the Arctic. Supporting healthy communities, and strengthening a state-based agenda for Arctic science and research.

Now Madam Chair, when we started out in this adventure four years ago we had three audiences we wanted to target for learning what it is to be in Arctic jurisdiction, the legislature itself, the executive branch and our federal partners. I think we've addressed that in the implementation plan and the report as well.

It comprises that the articulation of Alaska's Arctic policy. We want to be a leader in Arctic policy, and we want to effectively partner with the federal government on shaping a prosperous Arctic future.

Alaskans are on the forefront of new exploration, new uses of Arctic resources and new circumpolar cooperation. Alaska is providing relevant information about the reality of an emerging Arctic and understand in communicating the critical issue that affects our state and instilling confidence in the promise of safety and prosperity is essential as Alaska and for America as we move forward.

Now, Senator, we've had this conversation privately, but we feel that it's important to share with everyone, we're not a snow globe. We're not little Eskimos in a museum and in an environment that needs no development. We're not ready for it. We don't want that.

Madam Chair, you have copies of the final report on the implementation plan, but I'll just point out four efforts that we've identified that are important. On page 17 there are three lines of effort that fit into the Arctic Council's initiatives and will bolster the Council's activities for economic security for the people who live in the Arctic. Another line of effort is strengthen and develop a mechanism for resource production related revenue sharing. That cannot be emphasized enough because any revenue that comes off the offshore has to come onshore, and those communities will be impacted.

The third effort is economic returns to Alaska and Alaska communities and the individuals in the maritime fishing activities.

But the other one, this is a shout out to the Coast Guard, Admiral Able of the 17th District has already visited the capital and my office and the Senator's office, is that there is three initiatives that are on pages 22 and 23 that the Coast Guard is already working

on. They appreciated the partnership because they know that the Coast Guard is key to Alaska's future.

I'd like to note just for the record, Madam Chair, that this journey I said started four years ago included the Northern Waters Task Force that was chaired by then Representative Reggie Joule. Those two years identified the questions and hopefully this implementation plan provides some of the answers and some of directives we need to go forward with.

Also, Senator, you mentioned the PNWER Arctic Caucus and that's Alaska, the Yukon and Northwest Territories. I'm proud to say that Honorable David Ramsay is in the audience observing as well. Those Canadian neighbors are key to Alaska's future and to America's future as well.

And in closing, Madam Chair, is that you represent a state that has many faces, but in our Arctic face, Barrow, of course, Kotz, Nome, Bethel, Dillingham and King Cove are all in the Arctic. Thank you. Thank you, Madam Chair.

The CHAIRMAN. Thank you, Mr. Herron.

Senator McGuire.

STATEMENT OF HON. LESIL MCGUIRE, SENATOR, ALASKA STATE LEGISLATURE

Ms. MCGUIRE. Good morning, Madam Chair and congratulations on behalf of all the Alaskans here in the room today, it's an honor to see you sitting here and thank you to the other members who braved the weather to come out today on this important issue.

As a State Senator, I know how these hearings can bring you relevance and can also drain on in other areas. So I'm going to try to synthesize a few points down if I were on your side what I would want to know.

The first thing is you heard from my colleague next to me, Representative Herron. The two of us have been chairing the Alaska Arctic Policy Commission now for the last two years. There is a series of reports that are here for you. They're online. Your staff will have them. And we hope that you'll look to them as a resource to guide you in crafting Arctic policy on behalf of the federal government.

The most important thing that I want to say to you today is it is Alaska that makes the United States an Arctic nation, but it's all of you and going to take all of you to really bring the Arctic into the forefront of federal policy making and efforts in the infrastructure development.

As it's been noted by the Chair and by you, yourself, Senator Cantwell, we're behind. In all the places that I've traveled and visited along with Representative Herron, we're the one of the eight that's the furthest behind. We're lacking in any deep water ports. We're lacking when it comes to support for spill response, and yet our federal government has taken in over $4 billion in lease returns.

And so, if I were sitting on your side one of the takeaways that I would have would be because it affects all of us so greatly there are resources that have been taken in by the federal government. It's time for us to start investing in infrastructure and policies that will move us forward, not just words. These are nice words. These

are nice policies, but the actual investment of infrastructure is something that, I think, we'll be looking to you two women to lead on.

The state has been doing its part. We have a fund that has over $50 million in spill response dollars that are sitting there in case something would happen.

We also have one of the greatest, most innovative vessel response tracking systems, and I know you both have seen this. Captain Ed Page, has presented this.

We have been a foremost leader in Arctic logistics and microgrid technology, hybrid wind diesel electric systems, Arctic engineering and of course, the Trans Alaska pipeline, the one major Arctic infrastructure project that the world has seen. Over 40 years now in existence. Great jobs. We've preserved and grown the porcupine caribou herd. We've provided safe, environmentally friendly, energy to America. At one point 20 percent of the domestic supply of energy to this country came from that one line.

So I just want to emphasize that point as well that's entirely appropriate that we're here before you today, Madam Chair, in the Senate Energy Committee, because the Arctic really is that place that holds America's energy security right there in its clutches. Between ANWR, between the National Petroleum Reserve of America and the Chukchi and the Beaufort Sea we have America's energy security sitting right there.

And so those policies are for you as you move forward, but I just encourage us when we do think about the Arctic to remember that it was just in 2012 that America was importing over 40 percent of its energy from other foreign countries that don't favor our belief in women's rights, our belief in human rights and in many cases, are our enemies. So that's something for this Committee, as you look at Arctic policy.

The last point that I want to make is the opportunity. Madam Chair, you have labeled the Committee hearing today as an opportunity. And that is how we, in the Alaska Arctic Policy Commission, 26 Commissioners, I want to point out only 10 of them were lawmakers, the other 16 subject matter experts. We traveled for two years all over the state.

The first day of every meeting was a listening session, and what we heard from Alaskans was opportunity. We've been dealing with climate change. We've been dealing with global warming for thousands of years, and Alaskans adapt, just like we do today. We put on our coats and we get out and we muck through it and we adapt.

What we don't need are policies that might come from the federal government that would hamstring us or make it more difficult for us to adapt. We're looking for partnership and help to adapt to that climate change. But as we move forward the opportunity, the $100 billion worth of private capital that's out there waiting to come into the Arctic, Alaskans are looking forward to that as that next chapter for their economy to fill up our pipeline and to develop jobs.

So I'm not going to read into the record our vision statements or our policy statements. They're here for you in these three documents. You're members of a Senate Committee. You're fully aware of how you can access those and look at them.

I wanted to try to bring a personal face to it. As an Alaskan Senator what I would be thinking about if I were on your side. And I thank you so much, Senator Murkowski for having us today.

[The prepared statement of Mr. Herron and Ms. McGuire follow:]

ALASKA ARCTIC POLICY COMMISSION

Co-Chair: Senator Lesil McGuire, Anchorage,
907.465.2995
Co-Chair: Representative Bob Herron, Bethel,
907.465.4942

Testimony for the
Senate Energy and Natural Resources Committee
March 5, 2015

On January 30, 2015 the Alaska Arctic Policy Commission released its Final Report consisting of three parts: the Final Report itself; an Implementation Plan; and an Executive Summary – all are available at www.akarctic.com, and you should all have copies in front of you.

The AAPC also developed a draft Arctic policy bill, which has been introduced in the Legislature by AAPC co-chairs Senator Lesil McGuire and Representative Bob Herron as SB16/HB 1. The AAPC's Final Report, Implementation Plan and SB16/HB 1 were all informed by public and expert testimony at the AAPC's plenary meetings, including testimony from numerous indigenous organizations. In addition, the AAPC convened work sessions and listening sessions on different topic areas. SB 16/HB 1 is designed to guide the state's initiatives (especially the strategic recommendations in the AAPC Implementation Plan) and inform U.S. domestic and international Arctic policy in order to best serve the interests of Alaskans and the nation.

The AAPC developed these policy statements based on 4 Vision statements:
1) To uphold the state's commitment to economically vibrant communities sustained by development activities consistent with the state's responsibility for a healthy environment;
2) Collaborate with all levels of government, tribes, industry, and NGO's to achieve transparent and inclusive Arctic decision-making resulting in more informed, sustainable and beneficial outcomes;
3) Enhance the security of the state through a safe and secure Arctic for individuals and communities;
4) Value and strengthen the resilience of communities and respect and integrate the culture and knowledge of Arctic peoples.

During one of our Commission's listening sessions in Barrow (which is on the coast of the Arctic Ocean), we had the pleasure of most of the NSAR's (National Strategy on the Arctic Region) implementation team teleconferencing in. During that conversation we pointed out that the word "people" was not in their plan. Anywhere. We would like to remind the committee that people live in the Arctic. It is all of our responsibility to treat these communities like we treat any other community: with respect and dignity. Efforts by the Executive Branch to lock up our land, to stifle our ability to economically develop and adapt to new climate situations is not just a disservice to Alaskans, it is a disservice to the country. Alaskans do not live in a snow globe, we live in the United States.

We have told the State Dept. that you cannot solve a global issue like climate change by hamstringing Alaska's ability to responsibly develop our resources. Adaptation is the key. However, in order for Alaskans to have the capacity to adapt to a changing climate, we must have the freedom of self-determination. Alaskans have 40years of responsible Arctic development experience. We are global leaders in things like:
Arctic logistics, Micro-Grids, Hybrid wind-diesel electric systems, Arctic engineering, and, Vessel tracking and compliance.

Alaska should not have to *ASK* for permission to develop our resources or our people. If this Administration is not going to be our advocate, the least they could do would be avoid being our opponent

The Implementation Plan and SB16/HB1 follow four priority lines of effort:

1) Promoting economic and resource development;
2) Addressing the infrastructure and response capacity gap in the Arctic;
3) Supporting healthy communities; and
4) Strengthening a state-based agenda for Arctic science & research.

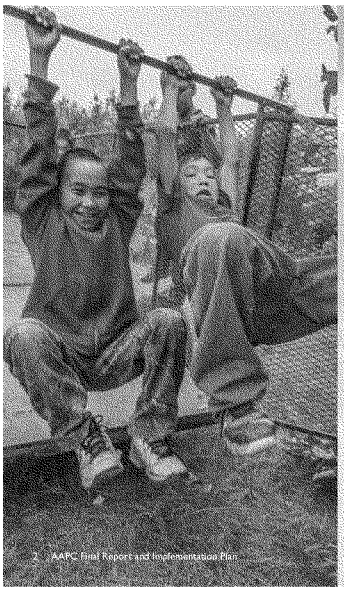
The AAPC Final Report and SB 16/HB 1 comprise the first comprehensive articulation of Alaska's arctic policy and will enable Alaska to become the leader it needs to be on Arctic policy, and to more effectively partner (and contend) with the federal government on shaping a prosperous Arctic future.

Alaskans are on the forefront of new exploration and use of Arctic resources, and of new circumpolar cooperation. Providing relevant information about the reality of the emerging Arctic, understanding and communicating the critical issues that affect this frontier, and instilling confidence in the promise of safety and prosperity is essential as Alaska and America move forward to ensure both.

You have copies of the Alaska Arctic Policy Commission's Final Report and Implementation Plan. Three of the efforts described on page 11, 13 and 15 by the AAPC would easily fit into the larger Arctic Council US Initiatives and would bolster the Council's activities vis-à-vis economic security for the people who live in the Arctic. They are 1(b): Strengthen or develop a mechanism for resource production-related revenue sharing to impacted communities; 1(d) Promote entrepreneurship and enterprise development; and 1(f) Increase economic returns to Alaska and Alaskan communities and individuals from maritime and fisheries activities.

We have argued, and will continue to argue that the US's Arctic Council priorities need to focus on the people: economic development for the people of the North. Which was the Canadian Chairmanship theme. The US now needs to take the baton from them and be the new leaders in this mission. That is the only way we will have the ability to adapt to new realities. Alaskans have been adapting for generations. To not seek Alaskan's advice and leadership on Arctic matters is shortsighted. The US is an Arctic nation only because of Alaska.


Final Report and Implementation Plan
EXECUTIVE SUMMARY
January 30, 2015
ALASKA ARCTIC POLICY COMMISSION



Alaskans are at the forefront of emerging economic and resource development opportunities, vibrant healthy communities, and circumpolar cooperation.

- Our vision for the Arctic is based on economic and resource development, a healthy environment, secure and safe communities, and transparent decision making.
- The Arctic is an integral part of Alaska's identity. It is home to many Alaskans and is an important part of our history, our culture, and our future.
- The Arctic also presents multitudes of opportunities that are being realized with an increasingly accessible Arctic. These opportunities are of strategic importance to Alaskans who are building on years of vision, hard work and experience living and working in the region.

Alaska's leaders remain engaged in monitoring the local, national and global impacts of a changing arctic. The state of Alaska has been responsive to these changes and is well positioned to continue to play a strong leadership role in the increased activity in the region.

The Alaska Arctic Policy Commission recognizes the many efforts already underway and lead by state agencies. The state is poised to leverage the intersection of opportunities and challenges that the Arctic presents, offering it's expertise to national and international efforts.

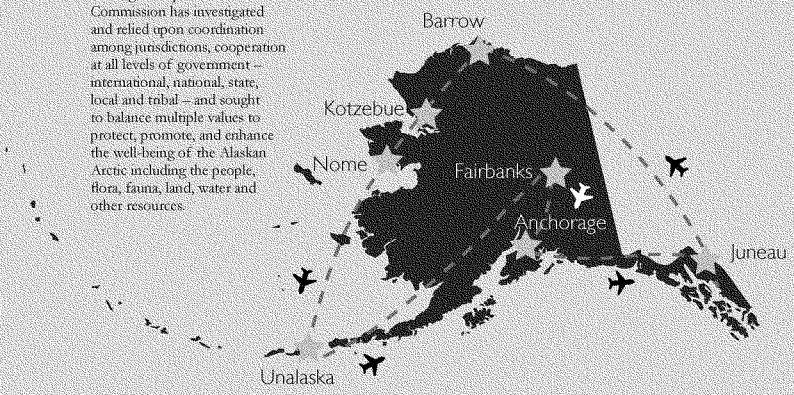
The Alaska Arctic Policy Commission

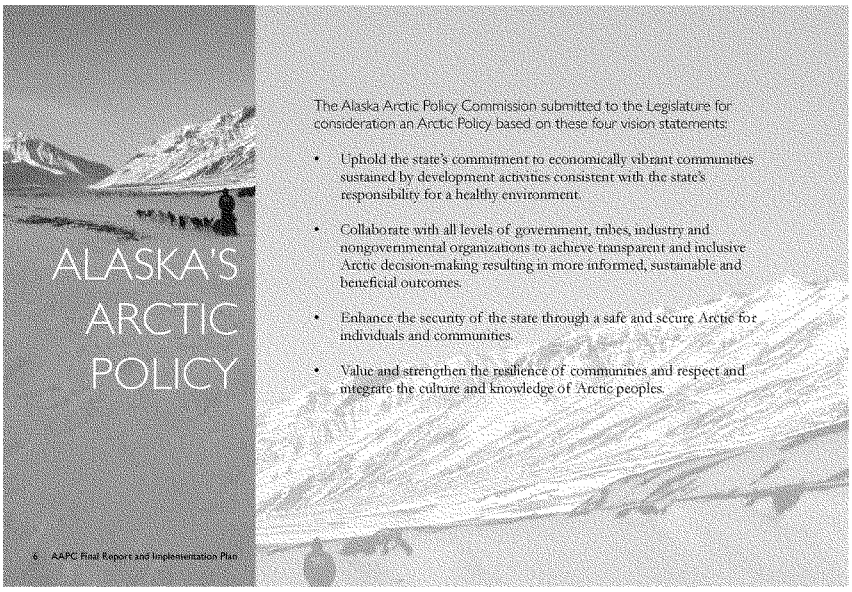
In April 2012, the Alaska State Legislature established the Alaska Arctic Policy Commission to "develop an Arctic policy for the state and produce a strategy for the implementation of an Arctic policy." The Commission has operated under the conviction that the state is an active and willing leader and partner in Arctic decision-making with its reliable expertise and resources.

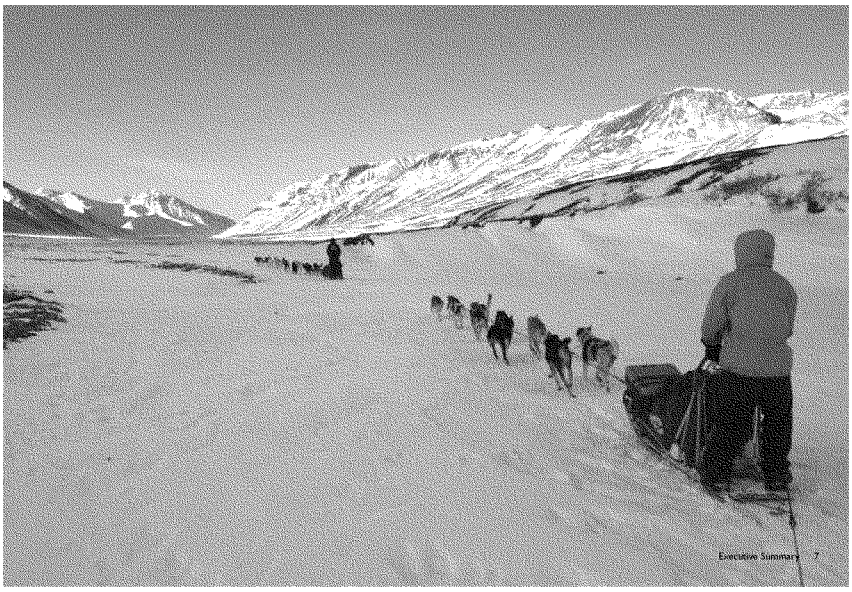
Furthermore, the Commission has remained committed to producing a policy for Alaska's Arctic that reflects the values of Alaskans, provides a suite of options to capitalize on the opportunities and safeguard against risk. It is a policy that will stand the test of time and act as a living document.

The Commission convened public meetings in seven locations across the state.

Through this process the Commission has investigated and relied upon coordination among jurisdictions, cooperation at all levels of government – international, national, state, local and tribal – and sought to balance multiple values to protect, promote, and enhance the well-being of the Alaskan Arctic including the people, flora, fauna, land, water and other resources.




ALASKA'S
ARCTIC
POLICY
The Alaska Arctic Policy Commission submitted to the Legislature for consideration an Arctic Policy based on these four vision statements:
• Uphold the state's commitment to economically vibrant communities sustained by development activities consistent with the state's responsibility for a healthy environment.
• Collaborate with all levels of government, tribes, industry and nongovernmental organizations to achieve transparent and inclusive Arctic decision-making resulting in more informed, sustainable and beneficial outcomes.
• Enhance the security of the state through a safe and secure Arctic for individuals and communities.
• Value and strengthen the resilience of communities and respect and integrate the culture and knowledge of Arctic peoples.
6 AAPC Final Report and Implementation Plan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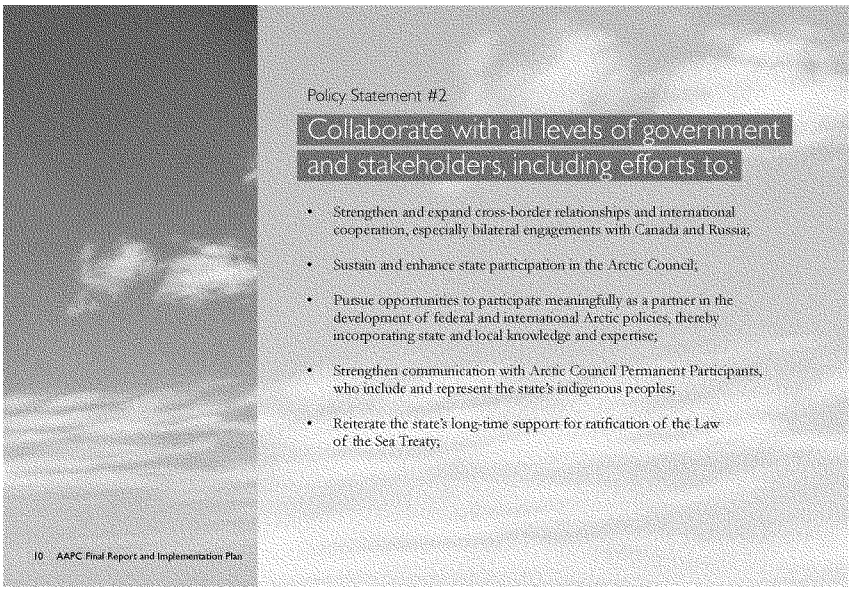
Policy Statement #1

Uphold the state's commitment to economically vibrant communities and responsibility for a healthy environment, including efforts to:

- Ensure that Arctic residents and communities benefit from economic and resource development activities in the region;
- Improve the efficiency, predictability, and stability of permitting and regulatory processes;
- Attract investment through the establishment of a positive investment climate and the development of strategic infrastructure;
- Sustain current, and develop new, approaches for responding to a changing climate;
- Encourage industrial and technological innovation in the private and academic sectors that focuses on emerging opportunities and challenges;



Policy Statement #2

Collaborate with all levels of government and stakeholders, including efforts to:

- Strengthen and expand cross-border relationships and international cooperation, especially bilateral engagements with Canada and Russia;
- Sustain and enhance state participation in the Arctic Council;
- Pursue opportunities to participate meaningfully as a partner in the development of federal and international Arctic policies, thereby incorporating state and local knowledge and expertise;
- Strengthen communication with Arctic Council Permanent Participants, who include and represent the state's indigenous peoples;
- Reiterate the state's long-time support for ratification of the Law of the Sea Treaty;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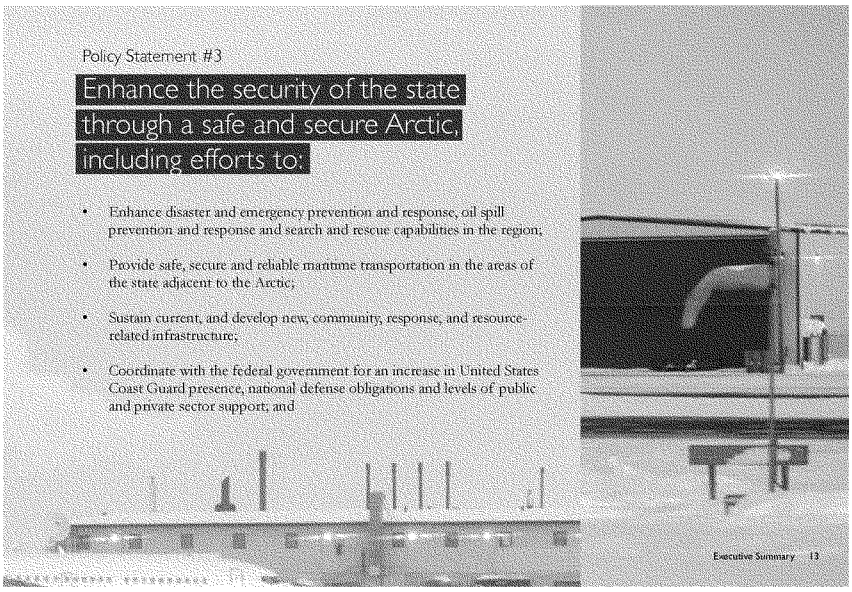
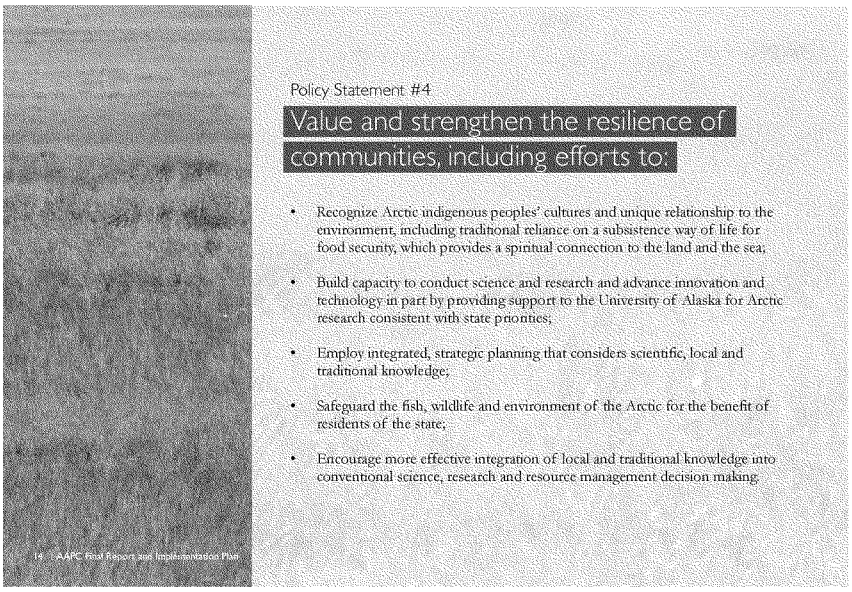

Policy Statement #3
Enhance the security of the state through a safe and secure Arctic, including efforts to:
• Enhance disaster and emergency prevention and response, oil spill prevention and response and search and rescue capabilities in the region;
• Provide safe, secure and reliable maritime transportation in the areas of the state adjacent to the Arctic;
• Sustain current, and develop new, community, response, and resource-related infrastructure;
• Coordinate with the federal government for an increase in United States Coast Guard presence, national defense obligations and levels of public and private sector support; and
Executive Summary 13


Policy Statement #4
Value and strengthen the resilience of communities, including efforts to:
• Recognize Arctic indigenous peoples' cultures and unique relationship to the environment, including traditional reliance on a subsistence way of life for food security, which provides a spiritual connection to the land and the sea;
• Build capacity to conduct science and research and advance innovation and technology in part by providing support to the University of Alaska for Arctic research consistent with state priorities;
• Employ integrated, strategic planning that considers scientific, local and traditional knowledge;
• Safeguard the fish, wildlife and environment of the Arctic for the benefit of residents of the state;
• Encourage more effective integration of local and traditional knowledge into conventional science, research and resource management decision making
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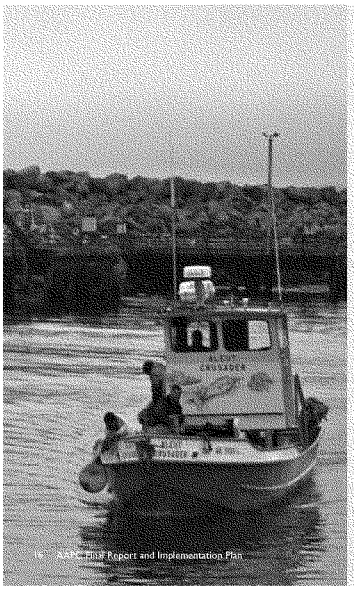
Executive Summary 11



Alaska's Arctic Policy articulates our vision and will guide the state's initiatives and inform U.S. domestic and international policy in ways that will ensure a benefit to Alaskans.

Over the course of the next few decades and into the future, increased access to the Arctic will bring more activity, traffic and people to the region. While this presents enormous opportunities for Alaska, there are potential risks involved. It is critical that policy makers act strategically to advantage Alaska in a changing Arctic. Therefore, the Alaska Arctic Policy Commission has provided as part of its final report:

• A review of economic, social, and environmental factors of relevance to the Arctic and more broadly to all Alaskans.

• An Implementation Plan that presents four lines of effort (drawn from our vision of the Arctic) and strategic recommendations that form a suite of potential independent actions for legislative consideration.

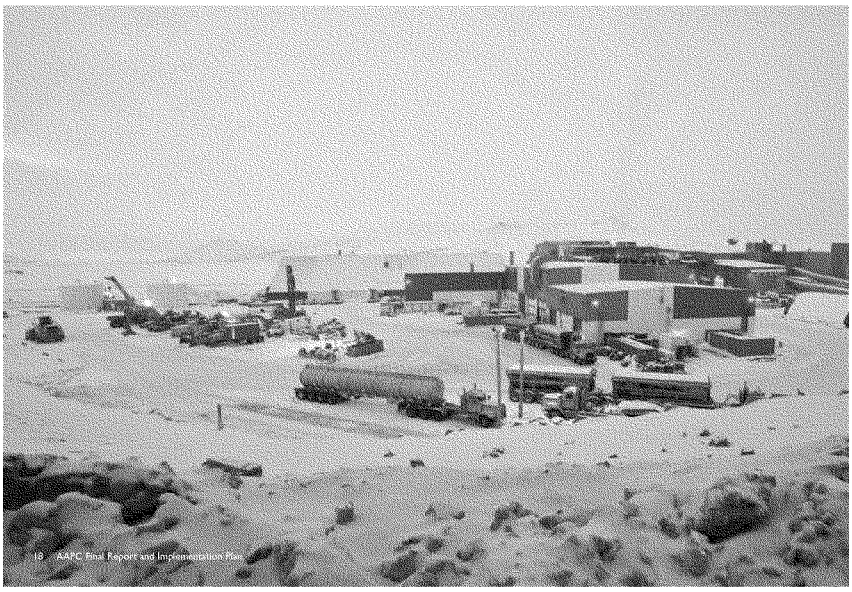
Arctic Policy Implementation Plan

The Commission has framed its strategic recommendations into four lines of effort:

- Economic and Resource Development
- Response Capacity
- Healthy Communities
- Science and Research

As part of the Implementation Plan for the state's Arctic Policy these recommendations should be considered a suite of options for future action. The Implementation Plan provides 'shovel-ready' actions for consideration by state policy-makers as Arctic interest develops and resources become available.

In an increasingly busy Arctic it is critical that Alaska proceed prudently. The work of the Commission is a culmination of the many years of effort, resources, and attention the Legislature has devoted to further understanding the current and emerging challenges in the Arctic. Alaska should fully engage and take an intentional leadership role in Arctic activities ensuring the alignment of developing policies with the priorities and needs of Alaskans.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LINE OF EFFORT #1
Promote Economic and Resource Development
Natural resource development is the most important economic driver in Alaska, today and into the future. Alaska has successfully integrated new technology, best practices and innovative design into resource development projects in Alaska's Arctic and must continue to be a leader. The strong economy, instituted by responsible natural resource development, provides a base for Alaska's Arctic communities to thrive by creating new economic opportunities such as infrastructure, jobs, contracting services and community revenue sharing. The state must continue to foster an economic investment climate that encourages and promotes development of the Arctic.
With careful consideration and state investment, the Arctic region will continue to produce returns to the state and communities that ensure community health and vitality.
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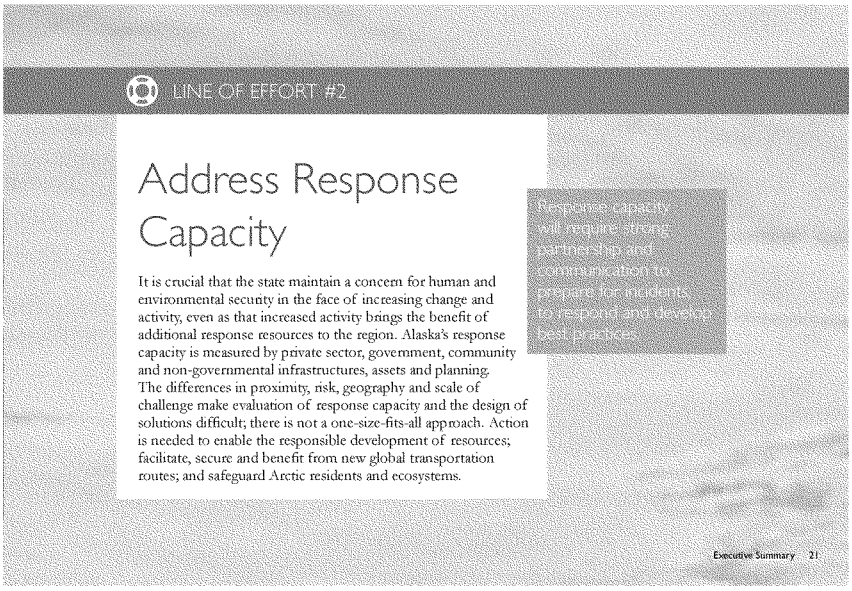
LINE OF EFFORT #2
Address Response Capacity
It is crucial that the state maintain a concern for human and environmental security in the face of increasing change and activity, even as that increased activity brings the benefit of additional response resources to the region. Alaska's response capacity is measured by private sector, government, community and non-governmental infrastructures, assets and planning. The differences in proximity, risk, geography and scale of challenge make evaluation of response capacity and the design of solutions difficult; there is not a one-size-fits-all approach. Action is needed to enable the responsible development of resources; facilitate, secure and benefit from new global transportation routes; and safeguard Arctic residents and ecosystems.
Response capacity will require strong partnership and communication to prepare for incidents to respond and develop best practices.
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LINE OF EFFORT #3
Support Healthy Communities
The justification for addressing Arctic issues is not only to better understand increasing changes or human activity in the region, but to recognize the historical and current presence of Alaskans in the region, with corresponding needs to enjoy a quality of life consistent with and responding to national standards, traditional ways of living, and a remote Arctic environment.
With sound economic opportunity for Alaskans, the state can build a vibrant economy, driven by private sector growth and a competitive business environment that has the potential to deliver social benefits while responding to the needs for a healthy environment.
Quality of life can be improved for the whole Arctic region without compromising the economic security and well-being of other communities or the state as a whole; healthy marine and terrestrial ecosystems; of effective governance supported by meaningful and broad-based citizen participation.
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LINE OF EFFORT #4
Strengthen Science and Research
Alaska's future prosperity largely depends on the scientific, technological, cultural and socioeconomic research it promotes in the Arctic in the coming years and its ability to integrate science into decision-making. Ongoing and new research in the Arctic must be designed to help monitor, assess and improve the health and well-being of communities and ecosystems; anticipate impacts associated with a changing climate and potential development activities; identify opportunities and appropriate mitigation measures; and aid in planning successful adaptation to environmental, societal and economic changes in the region.
Alaska should pursue strategies to broaden and strengthen the influence of its agencies, its academic experts and its local governments and innovators.
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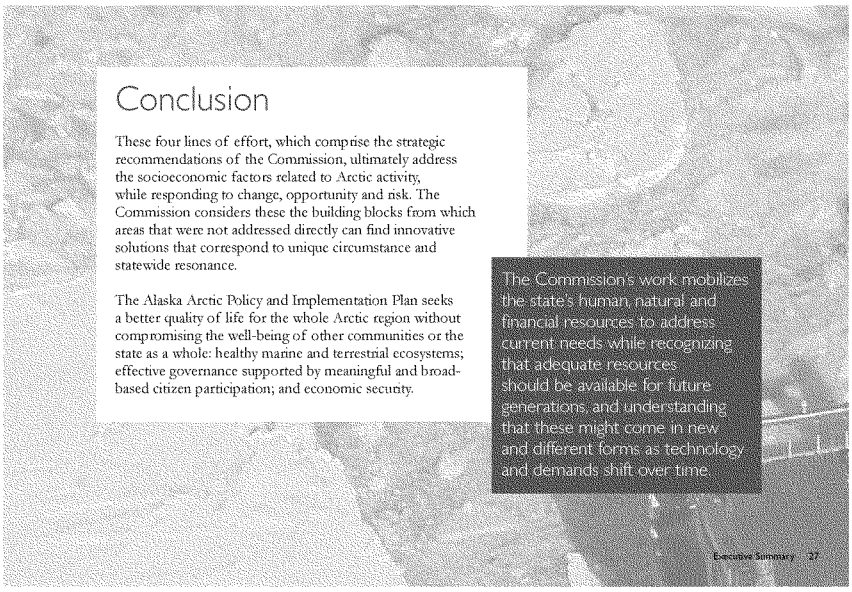
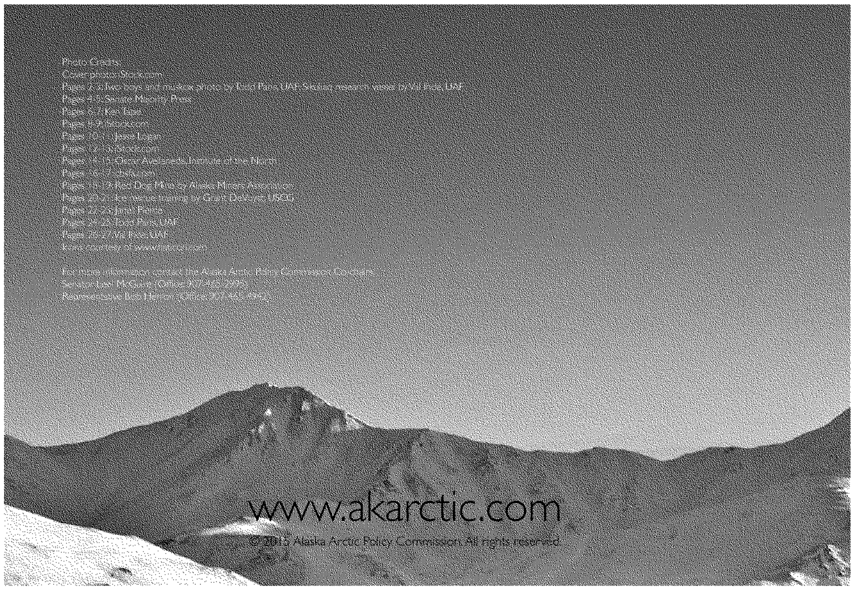


Conclusion

These four lines of effort, which comprise the strategic recommendations of the Commission, ultimately address the socioeconomic factors related to Arctic activity, while responding to change, opportunity and risk. The Commission considers these the building blocks from which areas that were not addressed directly can find innovative solutions that correspond to unique circumstance and statewide resonance.

The Alaska Arctic Policy and Implementation Plan seeks a better quality of life for the whole Arctic region without compromising the well-being of other communities or the state as a whole: healthy marine and terrestrial ecosystems; effective governance supported by meaningful and broad-based citizen participation; and economic security.

The Commission's work mobilizes the state's human, natural and financial resources to address current needs while recognizing that adequate resources should be available for future generations, and understanding that these might come in new and different forms as technology and demands shift over time.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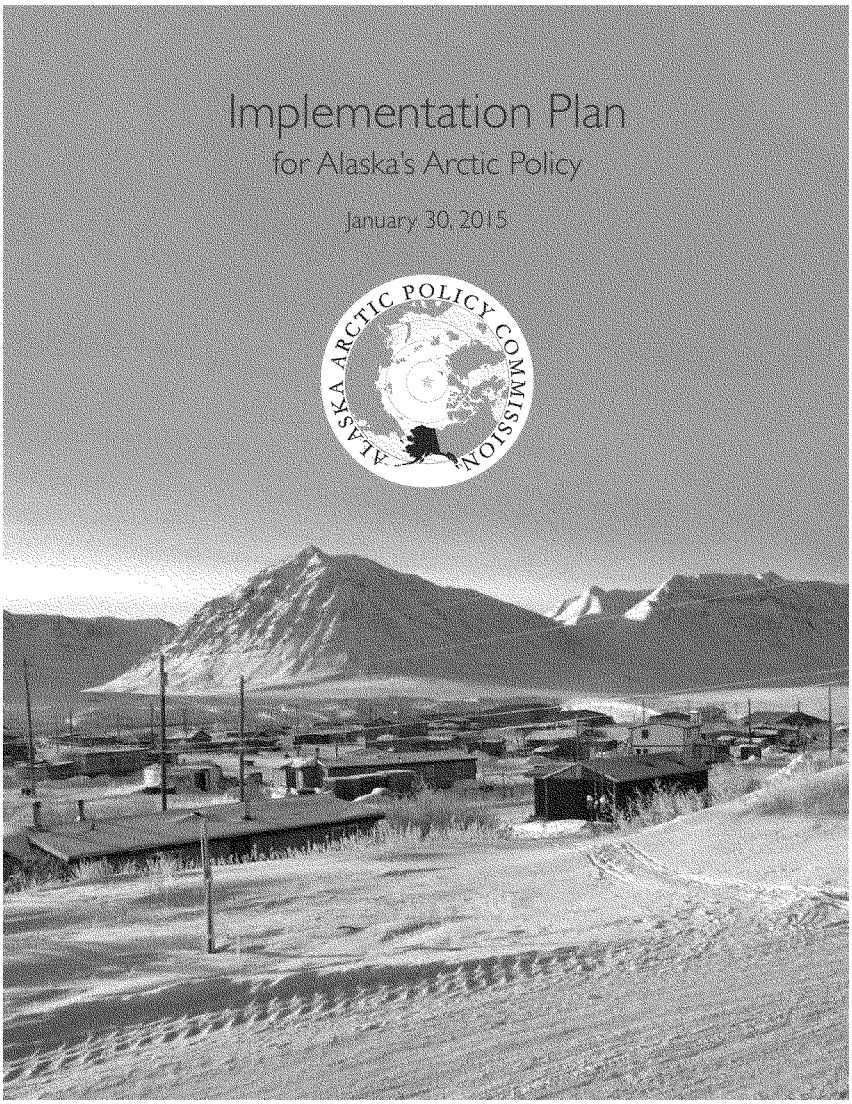
Implementation Plan
for Alaska's Arctic Policy
January 30, 2015
ALASKA ARCTIC POLICY COMMISSION

Table of Contents

Introduction

The Alaska Arctic Policy Commission (Commission) offers this Implementation Plan with the intent that current and future lawmakers can use recommendations contained herein to recognize, initiate and prioritize state action in the Arctic. The Commission has framed the following strategic recommendations into four lines of effort: economic and resource development; response capacity; healthy communities; and science and research. These four lines of effort would benefit from innovative solutions, increased investment and a solid stance of state leadership. The Commission identified items that fall within state jurisdiction and for which it has the authority to implement associated action plans.

The four lines of effort and strategic recommendations of the Commission ultimately address the socio-economic factors related to Arctic activity. The recommendations address and respond to change, opportunity and risk. Within each line of effort, the Commission has identified factors necessitating high priority consideration given their potential scale of impact – responding to significant gaps and/or opportunities. These recommendations, as part of the Implementation Plan for the state's Arctic policy, should be considered a suite of options for future action. The Implementation Plan provides near 'shovel-ready' actions for consideration by state policymakers as Arctic interest develops and resources become available.

Each strategic recommendation identifies a *lead* state agency and presents a brief *justification* for why the topic is important to the Alaskan Arctic and highlights existing gaps that could be filled. The *resources needed* section covers both fiscal and leveraged resources, including suggesting *partners* that may offer contributions from state, federal and other organizations. The *execution section* focuses on some key actions the lead agency and partners could take, while the *legislative actions* lists suggested actions for Legislative consideration. Each strategic recommendation concludes with an *evaluation* section that includes several measures that can help assess and track progress made to realize the recommendation.

It is critical that Alaska's response to an increase in Arctic activity proceed in a prudent manner. The work of the Commission is a culmination of many years of effort, resources and legislative attention directed to further understand and prepare for the current and emerging challenges in the Arctic. Through this process the Commission has learned about and relied upon coordination among jurisdictions, cooperation at all levels of government – international, national, state, local and tribal – and sought to balance a breadth of values to protect, promote and enhance the well-being of the Alaskan Arctic including the people, flora, fauna, land, water and other resources. Alaska must stake a demonstrative and intentional leadership role in Arctic activities ensuring the alignment of developing policies with the priorities and needs of Alaskans.

Acronyms Frequently Used

ACEP	Alaska Center for Energy and Power
AEA	Alaska Energy Authority
AIDEA	Alaska Industrial Development and Export Authority
AOOS	Alaska Ocean Observing System
DCCED	Alaska Department of Commerce, Community and Economic Development
DEC	Alaska Department of Environmental Conservation
DF&G	Alaska Department of Fish and Game
DMVA	Alaska Department of Military and Veterans Affairs
DNR	Alaska Department of Natural Resources
DOL	Alaska Department of Law
DOLWD	Alaska Department of Labor and Workforce Development
DOT&PF	Alaska Department of Transportation and Public Facilities
DOR	Alaska Department of Revenue
MXAK	Marine Exchange of Alaska
OIT	Alaska Office of International Trade
SCoR	Alaska Statewide Committee for Research

The Alaska Arctic Policy Commission submits to the Legislature for consideration this language for an Alaska Arctic Policy bill. It is possible that through the legislative process changes will be made.

An Act Declaring the Arctic Policy of the State

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

LEGISLATIVE FINDINGS AND INTENT

***Section. 1.** The uncodified law of the State of Alaska is amended by adding a new section to read:

(a) The legislature finds that

(1) the state is what makes the United States an Arctic nation;

(2) the entirety of the state is affected by the activities and prosperity in the Arctic region, and conversely, the Arctic region is affected by the activities and prosperity in the other regions of the state;

(3) residents of the state, having lived and worked in the Arctic region for decades, have developed expert knowledge regarding a full range of activities and issues involving the region;

(4) residents of the state recognize the risks that come with climate variability and emerging threats to ecosystems, as well as increased maritime activity, but are optimistic that the skillful application of expertise, coupled with circumpolar cooperation, will usher in a new era of economic and resource development that will improve the quality of life for residents of the state;

(5) the development of the state's natural resources in an environmentally and socially responsible manner is essential to the development of the state's economy and to the well-being of the residents of the state;

(6) respect for the indigenous peoples who have been the majority of the inhabitants of the Arctic region for thousands of years and who depend on a healthy environment to ensure their physical and spiritual well-being is critical to understanding and strengthening the Arctic region;

(7) the United States, other nations, and international bodies, including the Arctic Council, are rapidly developing Arctic strategies and policies, and therefore it is essential that both the state and the nation communicate the reality, richness and responsibility that comes with being in the Arctic, including communicating the need to provide safety, security and prosperity to the region;

(8) it is essential for the state and federal government to strengthen their collaboration on Arctic issues, including coordination when creating strategies, policies and implementation plans related to the Arctic, as both continue to engage in international circumpolar activity;

(9) the state should develop and maintain capacity, in the form of an official body or bodies within the executive or legislative branch, or both, to develop further strategies and policies for the Arctic region that respond to the priorities and critical needs of residents of the state.

(b) It is the intent of the legislature that this declaration of Arctic policy

(1) be implemented through statutes and regulations;

(2) not conflict with, subjugate, or duplicate other existing state policy;

(3) guide future legislation derived from the implementation strategy developed by the Alaska Arctic Policy Commission;

(4) clearly communicate the interests of residents of the state to the federal government, the governments of other nations and other international bodies developing policies related to the Arctic.

***Sec. 2. AS 44.99** is amended by adding a new section to read:

Sec. 44.99.105. Declaration of state Arctic policy.

(a) It is the policy of the state, as it relates to the Arctic to,

(1) uphold the state's commitment to economically vibrant communities sustained by development activities consistent with the state's responsibility for a healthy environment, including efforts to

(A) ensure that Arctic residents and communities benefit from economic and resource development activities in the region;

(B) improve the efficiency, predictability, and stability of permitting and regulatory processes;

(C) attract investment through the establishment of a positive investment climate and the development of strategic infrastructure;

(D) sustain current, and develop new, approaches for responding to a changing climate;

(E) encourage industrial and technological innovation in the private and academic sectors that focuses on emerging opportunities and challenges;

(2) collaborate with all levels of government, tribes, industry and nongovernmental organizations to achieve transparent and inclusive Arctic decision-making resulting in more informed, sustainable and beneficial outcomes, including efforts to

(A) strengthen and expand cross-border relationships and international cooperation, especially bilateral engagements with Canada and Russia;

(B) sustain and enhance state participation in the Arctic Council;

(C) pursue opportunities to participate meaningfully as a partner in the development of federal and international Arctic policies, thereby incorporating state and local knowledge and expertise;

(D) strengthen communication with Arctic Council Permanent Participants, who include and represent the state's indigenous peoples;

(E) reiterate the state's long-time support for ratification of the Law of the Sea Treaty;

(3) enhance the security of the state through a safe and secure Arctic for individuals and communities, including efforts to

(A) enhance disaster and emergency prevention and response, oil spill prevention and response and search and rescue capabilities in the region;

(B) provide safe, secure and reliable maritime transportation in the areas of the state adjacent to the Arctic;

(C) sustain current, and develop new, community, response, and resource-related infrastructure;

(D) coordinate with the federal government for an increase in United States Coast Guard presence, national defense obligations and levels of public and private sector support; and

(4) value and strengthen the resilience of communities and respect and integrate the culture and knowledge of Arctic peoples, including efforts to

(A) recognize Arctic indigenous peoples' cultures and unique relationship to the environment, including traditional reliance on a subsistence way of life for food security, which provides a spiritual connection to the land and the sea;

(B) build capacity to conduct science and research and advance innovation and technology in part by providing support to the University of Alaska for Arctic research consistent with state priorities;

(C) employ integrated, strategic planning that considers scientific, local and traditional knowledge;

(D) safeguard the fish, wildlife and environment of the Arctic for the benefit of residents of the state;

(E) encourage more effective integration of local and traditional knowledge into conventional science, research and resource management decision making.

(b) It is important to the state, as it relates to the Arctic, to support the strategic recommendations of an implementation plan developed by the Alaska Arctic Policy Commission to encourage consideration of recommendations developed by the Alaska Arctic Policy Commission. Priority lines of effort for the Arctic policy of the state include

(1) promoting economic and resource development;

(2) addressing the response capacity gap in the Arctic region;

(3) supporting healthy communities; and

(4) strengthening a state-based agenda for science and research in the Arctic.

(c) In this section, "Arctic" means the area of the state north of the Arctic Circle, north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers, all contiguous seas, including the Arctic Ocean, and the Beaufort, Bering, and Chukchi Seas, and the Aleutian Chain, except that, for the purpose of international Arctic policy, "Arctic" means the entirety of the state.

List of Strategic Recommendations

Strategic Line of Effort #1 – The state of Alaska will promote economic and resource development

1A - Facilitate the development of Arctic port systems in the Bering Strait region to support export, response and regional development.

1B - Strengthen or develop a mechanism for resource production-related revenue sharing to impacted communities.

1C - Lead collaborative efforts between multiple levels of government that achieve predictable, timely and efficient state and federal permitting based on good information, sound science, clear legal foundation and reasonable economic feasibility.

1D - Promote entrepreneurship and enterprise development.

1E - Support and advocate for multiple-use of Arctic public and ANILCA lands and promote prudent oil and gas exploration and development in the Arctic.

1F - Increase economic returns to Alaska and Alaskan communities and individuals from maritime and fisheries activities.

1G - Support the continued exploration and development of the Ambler Mining District, Mid Yukon-Kuskokwim River and the Northern Alaskan Coal Province.

1H - Build on and promote Alaska's position as a global leader in microgrid deployment and operation to advance a knowledge-based export economy, creating new jobs and revenue for the state.

1I - Encourage foreign and domestic private sector capital investment in Alaska's resource industries through stable, predictable and competitive tax policies.

Strategic Line of Effort #2 – The state of Alaska will address the response capacity gap in Alaska's Arctic

2A - Ensure strengthened capacity within the Administration to address Arctic maritime, science, climate and security issues.

2B - Support efforts to improve and complete communications, mapping, nautical charting, navigational infrastructure, hydrography and bathymetry in the Arctic region.

2C - Expand development of appropriately integrated systems to monitor and communicate Arctic maritime information.

2D - Facilitate and secure public and private investment in support of critical search and rescue, oil spill response and broader emergency response infrastructure.

2E - Assure the state of Alaska Spill Prevention and Response programs have sufficient resources to meet ongoing spill prevention and response needs in the Arctic.

2F - Strengthen private, public and nonprofit oil spill response organizations to ensure expertise in open water, broken ice, near shore and sensitive area protection; and be able to meet contingency plan requirements and operate effectively in the Arctic.

2G - Ensure that a variety of response tools are readily available and can be deployed during an oil or hazardous substance discharge or release.

2H - Foster and strengthen international partnerships with other Arctic nations, establishing bilateral partnerships with, in particular, Canada and Russia, to address emerging opportunities and challenges in the Arctic.

Strategic Line of Effort #3 -- The state of Alaska will support healthy communities

3A - Foster the delivery of reliable and affordable in-home water, sewer, and sanitation services in all rural Arctic communities.

3B - Reduce power and heating costs in rural Alaskan Arctic communities.

3C - Support long-term strategic planning efforts that utilize past achievements, leverage existing methods and strengthen local planning that assesses and directs economic, community and infrastructure development, as well as environmental protection and human safety.

3D - Anticipate, evaluate and respond to risks from climate change related to land erosion and deterioration of community infrastructure and services; and support community efforts to adapt and relocate when necessary.

3E - Develop and support public education and outreach efforts that (a) enhance the understanding of Arctic conservation including biodiversity and the sustainable use of biological resources and management of natural resources and (b) promote public participation in development of fish and wildlife management plans within existing management systems and policies.

3F - Enforce measures that protect and help further understanding of food security of Arctic peoples and communities.

3G - Identify and promote industry, community and state practices that promote sustainability of subsistence resources while protecting against undue ESA listings and broad-brush critical habitat designations.

3H - Create workforce development programs to prepare Arctic residents to participate in all aspects and phases of Arctic development.

Strategic Line of Effort #4 – The state of Alaska will strengthen Alaska's Arctic science and research

4A - Ensure state funding to, and partnership with, the University of Alaska for Arctic research that aligns with state priorities and leverages the University's exceptional facilities and academic capacity.

4B - Increase collaboration and strengthen capacity for coordination within the Arctic science and research communities.

4C - Strengthen efforts to incorporate local and traditional knowledge into science and research and use this collective knowledge to inform management, health, safety, response and environmental decisions.

4D - Improve, support and invest in data collaboration, integration, management and long-term storage and archiving.

4E - Support monitoring, baseline and observational data collection to enhance understanding of Arctic ecosystems and regional climate changes.

4F - Invest in U.S. Arctic weather, water and ice forecasting systems.

4G - Update hydrocarbon and mineral resource estimates and mapping in the Alaskan Arctic.

THE COMMISSION NOTES THE FOLLOWING AS A STANDALONE RECOMMENDATION IN SUPPORT OF THE ARCTIC POLICY.

Create a Legislative Committee(s) on Arctic Issues.

Lead: Legislature

Justification

The Legislature has invested time and resources toward understanding the diverse and complex Arctic issues facing the state now and in the future. The Alaska Northern Waters Task Force, (ANWTF), was legislatively created in the Spring of 2010 and held meetings across the state from October 2010 to December 2011. ANWTF issued its final report in January of 2012 at which time the Alaska Arctic Policy Commission, (Commission or AAPC), was formed. Upon the delivery of the Commission's Final Report, Arctic Policy, and Implementation Plan, the Legislature will need to consider how it will proceed. The Arctic is a dynamic environment, rich in resources and the potential for economic development in the face of decreasing summer sea ice and an increase in marine traffic. The value of ensuring public, environmental and cultural safety and security continues to be a priority. Arctic issues are currently either not receiving direct attention in the Legislature, or are appropriated in a piece-meal manner to numerous committees.

Resources Needed

Fiscal – Cost to create new committee(s) is absorbed within the Legislature's budget.

Leveraged – Existing legislative processes.

Partners – Governor's office and AAPC members.

Execution

There are a number of options including, but not limited to: House Special Committee on Arctic Affairs; Senate Special Committee on Arctic Affairs; Joint Committee on Arctic Affairs; House Standing Committee on Arctic Affairs; Senate Standing Committee on Arctic Affairs. The Special Committees would require a Simple Resolution passed by the respective body; the Standing Committees would require a Concurrent Resolution passed by both bodies; and the Joint Committee would require either a House or Senate Concurrent Resolution passed by both bodies. None of these types of resolutions require committee referrals; they can go straight to the House or Senate floors. After passage of the relevant resolution(s), the House's and/or Senate's Committee on Committees would meet and populate the Arctic Committees.

Legislative Actions

1. Each Legislative body should consider which type of Committee(s), structure and membership would best serve the needs of the Legislature and take the steps necessary to create the appropriate Committee(s).
2. Committee(s) should host overviews on Arctic issues and meet to review Arctic legislation.
3. The Legislature will ask the Administration and appropriate state agencies to address priorities relating to the four lines of effort in the Commission Implementation Plan: (1) promoting economic and resource development; (2) addressing the Arctic's response capacity gap; (3) supporting healthy communities; and (4) strengthening an Alaska Arctic science and research agenda.
4. The Legislature should request that the Governor establish a host committee for the Arctic Council and Arctic Economic Council.

Evaluation

Success will be measured by: 1) the number and quality of Arctic Committee(s) meetings; (2) how well the Committee(s) illuminates Arctic issues and understanding among all Legislative members; and 3) the creation or enhancement of Arctic-related legislation.

Strategic Line of Effort #1 – Promote Economic and Resource Development

The Commission recognizes that natural resource development has been, is, and will be the most important economic driver in Alaska. Alaska has successfully integrated new technology, best practices and innovative design into resource development projects in Alaska's Arctic and must continue to be a leader. The strong economy established by prudent natural resource development provides a base for Alaska's Arctic communities to thrive by creating new economic opportunities such as infrastructure, jobs, contracting services and community revenue sharing. The State must continue to foster an economic investment climate that encourages and promotes development of the Arctic.

With a sound base in place, economic opportunity can be created and leveraged through stable and strong state and federal government investment; mobilization of capital by Alaska Native regional and village corporations; and local economies that are supported by tourism, fishing, arts and other small businesses. Investment is necessary to take advantage of Alaska's strategic location in the opening Arctic. This support is important to global shipping routes and critical to national security.

While the state is rich in resources, there are five major barriers to economic and resource development:

- Capital Intensity – recognize that high capital costs required to develop new infrastructure and natural resources in the Arctic and to address high energy and transportation costs in communities.
- Regulatory Uncertainty – advocate for sound regulatory policies that are legally defensible and minimize third-party lawsuits, which increase the risk and cost to project planning and discourage investment.
- Revenue Sharing – explore new avenues to cost-share between communities or with neighboring jurisdictions to ensure concrete community benefits that are shared by Arctic residents.
- Distance to/from markets and communication centers – identify and invest in small-scale value-added businesses that displace outside dependence; evaluate and cultivate new markets; and invest in improved communication systems in Alaska's Arctic.
- Access – demand access to/through federal land holdings and consider state co-investment in resource-based infrastructure.

These are important hurdles to consider when evaluating the Arctic. However, with increased national and international attention, the state is in an advantageous and historically significant position to address such challenges. The state should be strategic in its approach by leveraging assets currently in place and facilitating intelligent investments. The state can achieve these goals by promoting competition, removing project barriers, promoting sound, sustainable investments and by fostering a climate ripe for private investment.

Alaska's Arctic has an enviable resource base that, with careful consideration and investment, will continue to produce returns to the state and its communities that ensure community health and vitality. Alaskans have long argued that economic development should not come at the cost of environmental stewardship; federal agencies should respect Alaska's long-standing commitment to deliver both.

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RECOMMENDATION 1A

Facilitate the development of Arctic port systems in the Bering Strait region to support export and regional development.

Lead: Department of Transportation & Public Facilities

Justification

Arctic port(s) development has been identified as one of the most critical pieces needed to support and respond to economic opportunity in the quickly developing Arctic. The improvement of existing onshore facilities and development of new facilities to serve the growing traffic in the Arctic is critical not only for resource development activities and community development but for environmental protection and the safety of mariners. The primary landowners in the region are Alaska Native village or regional corporations and access to most lands for improvement or construction of facilities requires their involvement and active participation. An organized effort to bring these landowners and interested parties together for project-specific prioritization and planning would enhance infrastructure development related to other efforts including spill response planning and staging, vessel routing, search and rescue, regional shipping support and commercial activities. The private sector also plays a large role here in the development of leases and new lease sales that will support new Arctic ports, which requires additional private and public sector buy in. The Coast Guard has no full-time assets beyond Dutch Harbor, a considerable distance from the Bering Strait, let alone Barrow. The construction of one or more deep draft ports along Alaska's coastline would assist in ensuring maritime safety, increasing economic development, and maintaining Arctic domain awareness. Port development in the region is a priority for the state as it relates to economic and resource development, as well as protection of the environment and safety at sea, but port development will not occur without public and private sector investment, including commitments by user groups to utilize these assets.

Resources Needed

Fiscal – Continued funding will be needed for planning and permitting; anticipate a multi-year investment in construction costs, and possible maintenance and operations depending on ownership.

Leveraged – This will depend on land ownership and the form of public-private partnership that develops, but it can be assumed that all parties will have an interest in pooling resources.

Partners – State – AIDEA, DCCED, DNR; Federal – USACE, USCG, NOAA, DOT, DOD, USNORTHCOM, DOI; Other – Alaska Native Regional and Village Corporations, private sector companies, local government.

Execution

DOT&PF will convene a Bering Strait Port Immediate Action Working Group that can follow up on the Deep Draft Port Study and work closely with landowners, state and federal agencies and other user groups. Local port authorities will be an additional asset in this work. One of the primary areas of consideration will be the ability to leverage investment, which should include options such as a regional port authority, a state-led port authority and/or AIDEA.

Legislative Actions

1. Request an update from landowners, DOT&PF and USACE on the status and future plans for Arctic port systems development.
2. Request from Bering Strait Native Corporation and AIDEA the further development of funding scenarios to determine the best return on state investment.
3. Form an Immediate Action Work Group (IAWG) that involves potential project partners to develop a strategic plan for port development.
4. Consider development of an Alaska Arctic port authority, or linking of local port authorities/commissions, which could also liaise with AIDEA to facilitate public-private partnerships and investment.

Evaluation

Success will be evaluated based on 1) whether the strategy leads to the development of Arctic port systems; 2) whether a port(s) is economic over its lifespan, including streamlined site control and/or property acquisitions for specific projects; and 3) whether the ports lead to an increased number of investment opportunities, resource development, new firms entering Alaska and a more favorable business climate.

RECOMMENDATION 12

Strengthen or develop a mechanism for resource production-related revenue sharing to impacted communities.

Lead: Department of Commerce, Community and Economic Development - Office of the Commissioner

Justification

As the state of Alaska advocates for both Arctic development opportunities on and offshore and more advanced capabilities for emergency preparedness and response, it is imperative to consider the benefits to impacted communities. With declining North Slope oil production, explorative industry access to federal land and Outer Continental Shelf (OCS) waters is critical to Alaska's economic stability. Alaskans residing in proximity to these efforts have an opportunity to directly support development by providing services, labor and equity investment in projects. Organized boroughs and municipalities have taxing authority; the North Slope and the Northwest Arctic Boroughs are two successful examples of communities that have instated development taxes that resulted in the provision of essential services. However, state revenue sharing does not have the flexibility to designate specific revenue recipients; the state cannot allocate specific project revenue to a nearby community though the revenue would increase funding for schools, roads and utilities, with tangible socio-economic benefits. The state of Alaska should continue to be a vocal proponent of federal revenue sharing from offshore development.

Resources Needed

Fiscal – No additional resources are necessary at this time, or in implementation, depending on the scenario.

Leveraged – Current state practices, AIDEA's ability for public private partnerships, local government, industry stakeholder engagement and federal efforts can all be utilized to offset review and analysis, and possibly implementation.

Partners – State – DNR-OPMP, AIDEA; Federal – EDA, DOI, Congress; Other – Alaska Native corporations and organizations, local governments, AML, ARDORs.

Execution

After considering the current state revenue sharing mechanism as well as other options, DCCED-DCRA will make a recommendation to the Governor's office and/or the state Legislature. It is envisioned that scenarios include: 1) creation of a mechanism within current statute to directly benefit impacted communities; 2) encourage the state of Alaska to act as facilitator between industry and communities; 3) create the ability to negotiate revenue sharing within AIDEA, possibly in the form of infrastructure investment; and 4) promote federal revenue sharing directed at local government, state government or Alaska Native organizations.

Legislative Actions

1. Direct DCRA's review of options and consider recommendations thereof.
2. Conduct hearings on offshore development to assess benefits to region and state.
3. Consider initiating a community savings account and process; anticipate and fund future needs.
4. Strengthen capacity of tribal organizations to accept revenue from resource-related development.

Evaluation

Success will be measured by: 1) the state's ability to create a funding stream from Arctic development that supports the socio-economic needs of impacted communities; and 2) an increased ability for a community to respond to the question, "Who benefits?" with: "We do."

RECOMMENDATION 1C

Lead collaborative efforts between multiple levels of government that achieve predictable, timely and efficient state and federal permitting based on good information, sound science, clear legal foundation and reasonable economic feasibility.

Lead: Department of Natural Resources – OPMP

Justification

The economic well-being of Arctic residents depends on the ability to prudently develop natural resources. Oil, gas and mineral development has provided the means to dramatically improve living conditions and opportunities for Arctic residents. State revenues from resource development will continue to be essential to support public services, infrastructure development and response capacity in the region. However, regulatory uncertainty and inefficiency threatens to discourage private sector investment. Alaska has some of the most sophisticated interagency coordination and permitting processes in the country, with the expertise, experience and commitment to safely develop the Alaskan Arctic's vast resources. The state can take a leadership role by engaging with federal partners to improve coordination between state and federal agencies.

Resources Needed

Fiscal – DNR staff would receive funding to lead interagency coordination.

Leveraged –There is an existing federal interagency group charged with addressing permitting. With integrated Arctic management priorities there may be additional federal funds to facilitate greater coordination between pertinent entities.

Partners – State – DEC; Department of Law; Federal – DOI, DOD, DOC, USDA, DOE, DHS, EPA, CEQ, OSTP, OMB; USACE; Other – Local governments; private sector industry; Alaska Native tribes, corporations, and organizations; trade groups

Execution

For more than 50 years state agencies have provided thorough environmental oversight for exploration and development activities in the Arctic. The state of Alaska leads and participates with federal agencies in several collaborative working groups on permitting. As the lead agency, DNR should utilize their previous experience to streamline the permitting process. The division should also continue to lead federal agencies in a collaborative work group such as the Regional Interagency Working Group or Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska, to discuss increased resource development activity in the Arctic and support efficient processes that respect environmental concerns. The multi-agency permitting initiative has resulted in incremental improvements in Alaska's permitting system. This is a tried and tested model and should be viewed as a continuous adaptive management process. The administration needs to continue to hold firm against federal overreach and, where necessary, use the court system to avoid burdening projects.

Legislative Actions

1. Ensure permitting agencies have necessary resources to meet existing and intensifying workload as development increases.
2. Consider legislative proposals that improve the predictability, timeliness and efficiency of the permitting systems, as well as to bring heightened accountability to the appeals and litigation processes.
3. Support the administration when needed to counter expanding federal regulatory jurisdiction.
4. Request DNR to lead interagency work group meetings focused on permitting and regulatory standards, and strategies to increase coordination, identify any need for future baseline data collection, research and monitoring and to enhance sharing and accessibility of scientific data.
5. Provide funding for the involvement of local governments and boroughs in working group meetings.

Evaluation

Success will be measured by: 1) decreased review period of permitting and regulatory applications; 2) whether local communities contend they have an opportunity to provide meaningful input; 3) greater interest from industries looking to invest in Alaska, (i.e. foster a competitive investment environment) and 4) decreased protracted and frustrating litigation that delays the completion of projects.

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RECOMMENDATION 10

Promote entrepreneurship and enterprise development.

Lead: Department of Commerce, Community and Economic Development – Division of Economic Development

Justification

Business development and entrepreneurship in Arctic communities is challenging. The bulk of economic activity in this region is conducted by government and outside vendors. Locally-owned and operated companies provide one mechanism for taking advantage of increased economic Arctic activity, even as it supports a community-managed transition towards a market-led, outward-looking economy. Communities' natural entrepreneurs are often fully employed and do not have the capacity to start a business on their own. Yet many rural entrepreneurs have not had exposure to many (or any) business startup plans or trained professionals. Thus they justly maintain misperceptions regarding this process. There is also a fear of failure. Successful entrepreneurs have been exposed to mentorship, which provides them with encouragement, guidance and training on the technical, business and fundraising aspects of bringing a product to market. Compounding these challenges is weak financial literacy and understanding of business financial management and fiscally feasible and sustainable start-up enterprise planning. Additionally, there exists a lack of access to outside project investors. Therefore, there is a strong need to expose would-be entrepreneurs to entrepreneurial thinking and practices. This education should occur as early as K-12. Alaska Native regional and village corporations have been able to respond to this challenge to some extent, but there is a strong need for a developed comprehensive educational approach for an entrepreneurial ecosystem in Arctic communities.

Resources Needed

Fiscal – Current resources could be redirected to support this effort.

Leveraged – Alaska Native regional corporations and CDQ "marketplace" initiatives; State Chamber and UAF Business Week; technical assistance programs.

Partners – State – DCCED-DCRA, ARDORs, local government; Federal – DOC, USDA, Small Business Development Corporation; Other – University of Alaska, Alaska Native Regional and Village Corporations, CDQs, AFN.

Execution

Starting young is essential. Support for programs like Lemonade Day Alaska or Junior Achievement encourages the initiation of an entrepreneurial mindset to communities and to young and emerging leaders. There is also a need to encourage entrepreneurial thinking in the school system. Several rural/remote schools have successfully adopted entrepreneurial curriculum even if it only encompasses bake sales that offset costs associated with attending regional sporting events. The types of businesses that will bring wealth to the Arctic region include small businesses like local food production, or mid to large enterprises such as bulk purchasing cooperatives, barging and transportation firms and/or supply chain firms to either oil and gas or shipping. These businesses might be best started as hybrid entities of the regional corporation. Reliable communications tools are essential for creating a network between investors, owners and global markets. Small start-up businesses can only begin to blossom once these other businesses begin to drive down the costs associated with bringing goods to these communities; a stronger entrepreneurial culture will follow.

Legislative Actions

1. Review investment in the Small Business Development Center and the University of Alaska's Center for Economic Development.
2. Consider more effective alignment between DCRA, ARDORs and CED.
3. Conduct review of business plan competitions and consider state investment or facilitation
4. Evaluate co-investment options.
5. Encourage the federal government to create a Northern Economic Development Agency, (modeled off of CANNOR), which would promote business development in the U.S. Arctic.

Evaluation

Success will be measured by: 1) expansion of and increased profit to current locally-owned businesses; and 2) development of new small, medium and large businesses

RECOMMENDATION 1E

Support and advocate for multiple-use of Arctic public and ANILCA lands and promote prudent oil and gas exploration and development in the Arctic.

Lead: Governor's office

Justification

Continued withdrawal of productive land from multiple-use designation would leave striking implications for Alaska's economy and communities. Access to and development of Arctic resources within the 1002 Area of the Coastal Plain of ANWR, NPR-A, North Slope and OCS are a top priority of Alaska. The 1002 Area was intentionally excluded from the Wilderness designation in 1980 and should remain so given that this area is considered the nation's most promising onshore oil and gas prospect. The NPR-A was designated by Congress in 1976 as a petroleum reserve yet each year more land is extracted from leasing plans that prohibit development. Oil production in the Arctic OCS could generate billions in federal revenue dollars and support Alaska's economy while benefitting local government. Oil production holds immense potential for supporting Arctic economies, creating jobs, refilling the Trans-Alaska Pipeline and generating billions of dollars in government revenues to help sustain local communities and deliver essential public services.

Resources Needed

Fiscal – Continued funding on a large scale to support the Department of Law (DOL) to defend unwarranted and illegal land lockups.

Leveraged – Continued funding of programs that work to inform public policy makers in Washington, D.C. and elsewhere. The state of Alaska should continue efforts to open Arctic areas to exploration and oppose federal efforts to extend wilderness designations.

Partners – State – DNR, DOL, CACFA; Federal – DOI, EPA, NMFS; Other – regulated community, local municipalities, Alaska Native Regional Corporations, American Petroleum Institute, private sector business associations.

Execution

The state needs to be relentless in its defense of Alaska's ability to develop its resources as part of a multiple use approach to public lands management. Working with the congressional delegation, Alaska Native Regional Corporations (ANCs), local governments and industry, the state should use all avenues and tools to insure Alaskans can develop their land. The Governor's Office, DNR and DOL have the capability to respond to resource development matters through staff that focus part of their efforts on oil and gas and ANILCA issues. It is essential that the state continue to fund organizations, such as Arctic Power, which have the expertise and experience in Washington, D.C. to advance the ANWR effort when the opportunity presents itself.

Legislative Actions

1. Support ANILCA training for federal agencies and Congress; administration-led efforts to defend ANILCA and communicate Alaska's multiple use guidelines and constitutional mandates; and agency participation in activities that involve multiple use land rights and to push back on expanded federal jurisdiction.
2. Continue to pass resolutions supporting oil and gas development in the Arctic; develop outreach strategies that target grassroots efforts to meet with federal Congressional delegations in support of exploration in areas that are currently closed for development activities.
3. Ensure administration and legislative participation in Arctic Council and Congressional activities to share information about the benefits of oil and gas development. This should include a "Why Arctic Development Matters" campaign, with the production of printed, video and web educational materials illustrating the benefits of Arctic oil development to the nation, the state of Alaska and Arctic communities.
4. The state should oppose any new federal land withdrawals, marine protected areas, Antiquities Act designations and BLM Wilderness studies on federal land in Alaska.

Evaluation

Success will be measured by: 1) a decrease in how often the state's multiple use land management guidelines are violated; 2) an increase in multi-use activity granted; and 3) an increase in available designated land for development.

RECOMMENDATION 1F

Increase economic returns to Alaska and Alaskan communities and individuals from maritime and fisheries activities.

Lead: Alaska Industrial Development and Export Authority

Justification

Alaska's maritime Arctic is comprised of some of the richest fishing grounds in the world. The sustainable fishing practices in the region have benefited Alaskans, communities and the economy for decades if not millennia. Fishing is the core economy for much of coastal Alaska where fish harvesting and processing often provide the only significant opportunities for private sector employment and where property and sales tax on maritime businesses is the largest source of local government revenue. Seafood harvesting and processing jobs provide more than 50 percent of the private sector employment in coastal Alaska. Some estimates put the fleet's docking in Seattle as a $5 billion boost to the Pacific Northwest's economy each year. It is essential that the state consider ways to capture additional revenue from the maritime industries without compromising economic viability of activities or health of species. Currently, the Alaskan ports of Dutch Harbor, Kodiak and Seward are actively pursuing increased infrastructure to expand port facilities and opportunity. Additionally, CDQ communities and the Port of Nome are a significant consideration. The state should mount a campaign that increases the number of vessels and amount of vessel time in Alaskan communities by investing significantly to support the needs of the industry.

Resources Needed

Fiscal – Significant capital resources should be anticipated.

Leveraged – Existing port facilities in Adak, Dutch Harbor, Kodiak and Seward.

Partners – State – DOT&PF, DEC, DF&G, ASMI, DCCED; Federal – NMFS, NOAA, USACE; Other – CDQs, At Sea Processors, local governments and port commissions, fishing industry.

Execution

A multi-part strategy must be considered to increase vessels and vessel hours at Alaska port facilities, including: 1) aiding the availability of resources the fishing fleet requires to service vessels; 2) import or strengthen the workforce and expertise necessary to repair and maintain vessels; 3) develop freshwater ports that can protect vessels from corrosive saltwater; 4) provide facilities that allow all-weather servicing of vessels; and 5) conduct expansive outreach to fishermen, vessel owners and, more broadly, the fishing community identifying a home base in Washington state, despite benefiting from a healthy Alaskan fishery.

Legislative Actions

1. Review of the Port of Seattle competitive advantages against what Alaskan ports can offer.
2. Assign fisheries development task force to address gaps and strengthen capacity.
3. Work with local governments, CDQs and the fisheries industry to craft an appropriate investment strategy.
4. Consider developing a maritime academy at AVTEC with potential internships at the Vigor Shipyards in Ketchikan.
5. Build capacity within Alaska Seafood Marketing Institute (ASMI) to add the marketing of Alaskan port facilities.

Evaluation

Success will be measured by: 1) an increase in the number of vessels that utilize Alaskan port facilities; and 2) an increase in the number of vessel hours at Alaskan ports; and 3) an increase in local government port revenue.

RECOMMENDATION 16

Support the continued exploration and development of the Ambler Mining District, Mid Yukon-Kuskokwim River and the Northern Alaskan Coal Province.

Lead: Department of Natural Resources

Justification

Historically, mining has been a cornerstone of Alaska's economy. Many roads, docks and other infrastructure throughout Alaska were originally constructed to serve the mining industry. Major communities like Fairbanks, Juneau and Nome were founded on mining activity. Today, a rejuvenated mining industry brings a broad range of benefits to Alaska, offering some of the highest paying jobs in both urban and rural Alaska, as well as generating significant local government tax payments and royalties to Native corporations for activity on their land. Recognizing that the Alaskan Arctic has vast reserves of mineral resources – from traditional base and precious metals to rare earth elements and coal. Beyond supply, however, the state has essential elements of strong governance, including effective policy, clear regulatory and permitting standards and a stable fiscal regime. To responsibly advance the exploration and development of Northern Region minerals, policy makers, community leaders and the private sector must work collaboratively to explore and develop resources safely and responsibly - developing policies that balance risk mitigation, cultural integrity and economic opportunity. The most significant challenge in the Arctic region is the elevated level of investment needed. The result of high energy and transportation costs, complicated access, a commitment to a healthy environment and stakeholder engagement is projects with high sticker prices. The potential benefits to the region from mineral development are impressive and – apart from oil and gas development occurring on the North Slope – are the most significant opportunity for residents of the region.

Resources Needed

Fiscal – High levels of capital investment.

Leveraged – The state has a number of partners that can bring assets to the table, including private companies, investment firms, state agencies and Alaska Native corporations.

Partners – State – AIDEA, DEC, DF&G, DOT&PF; Federal – DOI, EPA, USACE; Other – ANCs, village corporations, local governments, private sector industry and investment companies.

Execution

The state must identify clear priorities as it relates to mineral development, and these three action items would create the most opportunity in the Arctic: 1) DNR will assign a task force within OPMP to streamline regulatory and permitting efforts and increase avenues for local community involvement; 2) establishing a goal of collaborative communication between all necessary state and federal agencies, as well as landowners; and 3) state co-investment in energy or transportation to ensure positive economics, (AIDEA currently has the authority to drive this action and would be able to do so more effectively with a clear set of priorities). Long-time efforts at 'roads to resources' should be directed toward these three objectives, implemented in a phased approach. Recognizing that state resources are finite, operational stages should result in completed projects and revenue potential.

Legislative Actions

1. Resource Committees should convene hearings on high potential prospects, identifying key stakeholders and reviewing opportunities for streamlined investment and permitting.
2. Capital investment will be needed, and the Legislature should consider renewed focus on roads to resources connected to prospects, as well as remote energy solutions
3. The Legislature should consider leveraging AIDEA's role as an investment partner that could help attract domestic and international investment.
4. The Legislature's Resources Committees should convene a "mining session."

Evaluation

Success will be measured by: 1) increased investment aimed at reducing energy and transportation costs; and 2) forward movement toward production of mineral development at these prospects.

RECOMMENDATION 1A

Build on and promote Alaska's position as a global leader in microgrid deployment and operation to advance a knowledge-based export economy,creating new jobs and revenue for the state.

Lead: Alaska Energy Authority and Alaska Center for Energy and Power

Justification

Alaska has built a small industry around developing and supporting the 150+ microgrids – isolated systems individual to a community – across its geographically diverse regions. Since the 1960's, electricity generation in the remote regions of Alaska has been heavily reliant on diesel generators, which serve numerous islanded microgrids. Over the past decade, investment in renewable generation has increased dramatically to meet both a desire for greater energy independence and to reduce the cost of delivered power. The integration of variable resources (wind and PV), as well as limitations of local hydro and geothermal power has led to significant experience in the design, development and operation of these microgrids. Today there are over 100 small businesses, utilities and nonprofits with specialized expertise operating in Alaska. Many of these enterprises are interested in applying their knowledge outside of the state. Globally, the microgrid market is on the verge of exploding. A recent report by Navigant Research estimates the microgrid market will grow nearly 5-fold, to an estimated $40B in revenue by 2020. This is driven by both a need for greater grid surety and reliability in developed regions such as the continental U.S., as well as the expansion of electric grids in previously unserved regions of developing nations.

Resources Needed

Fiscal – Support for UAF's Alaska Center for Energy and Power (ACEP), and a capital budget request for microgrid design and implementation.

Leveraged – The Renewable Energy Grant Fund and the Emerging Energy Technology Fund.

Partners – State – DCCED; DOLWD; Federal – NREL, DOE, DOI, DOS, Denali Commission; Other – ACEP; University of Alaska; Alaska small businesses, utilities and local governments.

Execution

The state is positioned to capture 1% of the global microgrid market ($400M) in the next 5 years by capitalizing on an untapped business opportunity in Alaska. Much of this revenue would be generated by the 100+ small businesses currently working in this field, with significant potential for job growth across the state. This could be done by mirroring the highly successful 3-prong approach Iceland has taken in knowledge export of geothermal energy. There are three strategies to consider. 1) Use the Emerging Energy Technology Fund (EETF) as a model, request proposals from the private sector to develop and advance the needed technology for microgrid development. 2) Design an international training program in the development, operation and management of microgrids that incorporates renewable resources to highlight microgrid-based expertise. This program would be developed in collaboration with more rural Alaska communities serving as 'living laboratories' to highlight varied technologies and strategies related to microgrid design and operation. 3) Design a mechanism to pool Alaska talent from across the state through the creation of a for-profit or nonprofit organization, formed through UAF/ACEP and tasked with exporting Alaska microgrid know-how and expertise globally.

Legislative Actions

1. Support ACEP to convene a work session and catalogue the extensive microgrid expertise found within the state, matching that expertise with opportunities elsewhere and deploying both industry and academic resources to facilitate Alaska market entry that supports high quality jobs for Alaskans.
2. Consider designing an international training program in the development, operation, and management of microgrids that incorporates renewable resources to highlight microgrid-based expertise.

Evaluation

Success will be measured by: 1) expansion of jobs and revenue-generating opportunities for the state; and 2) demonstration of new technology in microgrid systems.

RECOMMENDATION 11

Encourage foreign and domestic private sector capital investment in Alaska's resource industries through stable, predictable and competitive tax policies.

Lead: Department of Revenue

Justification

Potential investors need a reliable and predictable set of rules before making investment decisions. Alaska must continue to promote a strong development climate with stable and competitive tax policies to maintain positive momentum in oil, gas and mineral investment and to attract new capital investment in other resource industries. Changing tax structures creates uncertainty about whether Alaska is a favorable place to conduct business. More than 90 percent of the state's general fund comes from the oil and gas industry, and a full third of jobs in the state have ties to oil and gas development. Thus, the entire state economy relies on a healthy and vibrant oil industry. Like the oil and gas industry, mining provides high-paying jobs. The most efficient way to increase these jobs is to develop more mines in Alaska. Alaska has six large producing, hard rock mines with only one in the Arctic despite the Arctic region's position as a global leader in mineral potential. The state of Alaska must encourage and support both foreign and domestic private sector capital investment in the Arctic's resource sector.

Resources Needed

Fiscal – Further investment in DOR's technical expertise and capacity should be considered, deepening knowledge held by the civil service.

Leveraged – Federal lease sales, land management and fiscal policy should also be considered for review.

Partners – State – DNR, APFC; Federal – IRS; Other – Local government, ANCs.

Execution

The current oil and gas production tax law should be maintained and more work is needed to inform citizens about the benefits a healthy oil and gas industry provides to all Alaskans. Should a new tax law be proposed for any industry, state and local officials, as well as corporations and communities, should insist upon durability and longevity that keep Alaska a competitive place to conduct business. Any tax law proposals should include objective evaluation of the impacts of the proposals on the global competitiveness of Alaska to attract investment capital.

Legislative Actions

1. Support current legislative efforts to track capital investments and evaluate return.
2. Calculate the immediate and long-term economic impact prior to changes in the current tax law, or proposing a new tax law using outside economic analysts.
3. Review of combined effective tax from local, state and national government take.
4. Regularly review the effect of current tax policy or capital investments.

Evaluation

Success will be evaluated by: 1) an increase in capital investment within the state; 2) new entrants to the state; and 3) maximization of state funding.

Strategic Line of Effort #2 – Address the Response Capacity Gap

One of the primary motivating factors for addressing an "emerging Arctic" is the concern for human and environmental security in the face of increasing change and activity. Alaska's response capacity is measured in infrastructure, assets and planning. When considering strategic investment in infrastructure in the Alaskan Arctic, it is important to understand the scope of the region, diversity, and its current resources. Differences in proximity, risk, geography and scale of challenge make evaluation of response capacity and the design of solutions difficult— a universal and encompassing approach is not plausible.

Time and distance are big logistical challenges for security and defense operations; Alaska's Arctic compounds these hurtles with a lack of communications and response infrastructure. Essentially, capabilities to address threat or aggression are sufficient; capabilities to support the civil sector and execute response operations – whether for oil spills or search and rescue – are limited. The strains on these provisions are further stressed by the lack of 1) economic activity, 2) infrastructure, and 3) public awareness. Often, agencies and organizations responsible for responding are poorly resourced.

Industry carries the primary responsibility for prevention, preparedness and response. Areas rich in natural resources correlate to high economic activity and resource development. Oil spill response will either be executed by resource development companies or through oil spill response organizations, which are the 'boots on the ground' for oil spill response. There is also a high level of effective coordination and communication between the private sector, state and federal agencies and a clear recognition that no single entity can address Arctic issues alone, which reinforces the need for collaboration. The Alaska Regional Response Team is the state, federal and tribal coordinating body for response operations and is an effective organization for developing and implementing the Unified Plan and sub-area planning process. Additional resources can be found in local government. An exemplary entity is the North Slope Borough who currently conducts search and rescue operations north of the Brooks Range with the assistance of the Alaska Air National Guard and United States Coast Guard.

Action is needed to enable the responsible development of resources; facilitate, secure, and benefit from new global transportation routes; and safeguard Arctic residents and ecosystems. Response infrastructure will by necessity, require strong partnership and communication to prepare for incidents, respond, and develop best practices.

RECOMMENDATION 2A

Ensure strengthened capacity within the Administration to address Arctic maritime, science, climate and security issues.

Lead: Governor's office

Justification

With the rate of change and increasing activity in Arctic waters and lands, the Governor and cabinet would benefit from specialized knowledge and policy expertise related to international, national and local waterways and land management, legal regimes, science, climate, security and defense. The U.S. counts on the Coast Guard, among others, for similar contributions, and strengthening the capacity of the Governor's office to liaise directly with the Coast Guard and other federal agencies would ensure a direct feedback loop between state of Alaska knowledge base and federal decision-making. Additionally, the ability to make recommendations to the Governor that would increase budget prioritization for the above-mentioned activities would result in more efficient Arctic coordination. It is important to recognize that maritime traffic – goods delivered to Alaska via Washington ports; community goods and fuel resupply along the coast; Bering Strait traffic; academic and government research vessels; and trans-Arctic shipping – directly impacts Alaska's economy and community health. The implications of international efforts that result from Arctic Council policy-shaping documents or IMO negotiations about the Polar Code are significant for Alaska. Further support should be given to the research and development of new technologies, as well as the use of best practices to, for example, reduce the risk of hazardous releases in the Arctic.

Resources Needed

Fiscal – Possible increase in administrative support; anticipate significant travel budget for national and international policy discussions.

Leveraged – State agencies and local government will be able to contribute valuable ground expertise to this position.

Partners – State – All agencies; Federal – DOS, DOI; Other – IMO, Arctic Council.

Execution

The Governor's office has the ability to specifically respond to Arctic-related matters and climate change through Commissioners and Deputy Commissioners who focus part of their portfolios on these important issues. Increasing capacity specifically on Arctic maritime, science, climate, security and defense issues would ensure the delivery of concrete policy recommendations and provide the state of Alaska's priorities and perspectives on these important issues. Strengthening capacity within the Governor's office on Arctic policy issues also provides an opportunity for increased facilitation of collaborative efforts between state and federal agencies, as well as outreach to local governments and the private sector within Alaska and with national and international partners. Some consideration should be given to the value of nonpolitical appointments that can provide continuity over time.

Legislative Actions

1. Develop a scope of work, including goals and desired outcomes, for an Arctic maritime, science, climate, security and defense portfolio.
2. Work with Governor's office to identify capacity for an Arctic maritime, science, climate, security and defense portfolio and accompanying budget.
3. Request that the portfolio holder(s) has the ability to act as a liaison between industry, the public and private sectors and indigenous organizations.

Evaluation

Success will be determined by: 1) enhancement of the Governor's office portfolio to include Arctic issues; 2) the ability of the Governor's office to coordinate and streamline state of Alaska policy statements and positions related to Arctic issues and intermodal transportation infrastructure development; and 3) deliver local and sub-national input into federal and international negotiations.

RECOMMENDATION 2B

Support efforts to improve and complete communications and mapping, nautical charting, navigational infrastructure, hydrography and bathymetry in the Arctic region.

Lead: Alaska Geospatial Council

Justification

Nautical charting and terrestrial mapping of the American Arctic, to the extent that it's been done, began in the 1800s with what today is considered outdated technology. Alaska's western and northern coasts have not been mapped since 1960. Insufficient mapping results in a lack of confidence by communities and industry alike. Even today, Alaska's coastline mapping is occurring at 1% annually versus 5% in the rest of the United States. NOAA currently estimates that it will take 25 years just to survey their high priority areas in Alaska that affect marine transportation. For the state of Alaska -- with a commitment to enhancing safety, environmental protection and economic development -- this is unacceptable. NOAA charting requires the gold standard of bathymetric data -- it is expensive and slow to acquire. Other data is already being acquired by private sector ships and tugs and barges, and could be shared by employing proper legal guidance. Terrestrial mapping is an increasing focus of the state as well, which is conducted by the Alaska Geospatial Council. While the state does not have sole jurisdictional authority over the Arctic, especially over northern waters, and neither does it have a desire to take on federal responsibilities without due compensation, the international need for accurate Arctic mapping is a good opportunity to partner with federal agencies for mutual benefit.

Resources Needed

Fiscal -- The state of Alaska should anticipate increased leadership as a facilitator of multi-agency cooperation; there is also the possibility of co-investment in this area.

Leveraged -- UAF's Geographic Information Network (GINA) of Alaska and the Sikuliaq research vessel; federal land management agencies; the private sector also makes incredible investments in data collection and mapping.

Partners -- State -- DOT&PF, DEC and DNR; Federal -- USCG, MARAD, NOAA, DOI; Other -- MXAK, AOOS, Alaska Marine Pilots.

Execution

DNR has been the lead agency on mapping efforts in the state, and has done much of its work in collaboration with state and federal agencies. The Alaska Geospatial Council, (AGC), was recently created and one of its top priorities is to research how to manage, make available and find an appropriate home for data. Hydrography research is well underway through the Hydrography Technical Working Group, under the auspices of the Alaska Climate Change Executive Roundtable and the AGC. The AGC can take a proactive role in articulating their top priorities and establishing objectives within the Arctic region, assisting NOAA where necessary to establish a geospatial foundation and ensure marine domain awareness. For instance, the state of Alaska could provide or assist in funding an increase of aerial and satellite imagery. DOT&PF should also be working closely with the Office of Coast Survey (Coast Pilot) to update hydrographic priorities, including navigation of the Bering Sea and Arctic approach waters, encourage consideration of improvements to the Coast Pilot in the Arctic region and working with the USGS for terrestrial priorities.

Legislative Actions

1. Broaden the scope of the Alaska Geospatial Council to include oceanographic charting and continue to support efforts to link state and federal mapping and charting work.
2. Encourage federal agencies to work with and incorporate state, local and traditional knowledge holders.
3. Consider state co-investment in mapping, charting, hydrography and bathymetry, including new technologies, maximizing use of satellites, unmanned underwater and aerial vehicles and submarine systems.
4. Continue statewide mapping efforts initiated by Alaskan agencies to update hydrographic priorities, including navigation of the Bering Sea and Arctic approach waters.
5. Continue to support the State's airborne geophysical program.
6. Work with federal and state agencies and the private sector to consider ways to "crowd-source" bathymetric and water level data acquired by the private sector and share appropriately.

Evaluation

Success will be measured by: 1) increasing the percentage of completed mapping and charting; and 2) enhanced user confidence.

RECOMMENDATION 2C

Expand development of appropriately integrated systems to monitor and communicate Arctic maritime information.

Lead: Marine Exchange of Alaska and Alaska Ocean Observing System

Justification

Integrated systems are paramount to ensure effective communication, situational awareness and safety in the Alaskan Arctic. There are multiple domains – land, water and space – that span both state and federal jurisdiction. There are two complementary types of marine information important to the future of the Alaskan Arctic. The first addresses the maintenance of operational awareness of maritime activity, especially vessel tracking, but also transmission of information on ice and water, ship speed and closed or sensitive areas for navigation. The primary asset for increased maritime domain awareness is Automatic Identification Systems, (AIS), supplemented by Long Range Tracking Systems. AIS is a piece of navigational equipment aboard many vessels, installed voluntarily or due to regulation, and which regularly transmits vessel data. However, AIS receivers have a limited spectrum and cannot provide comprehensive coverage so there will always be portions of Alaska and U.S. waters without AIS coverage. In those cases of remote operations, it is necessary to use several different forms of satellite tracking. An expanded AIS capacity will strengthen emergency response and ensure safe maritime transportation as well as provide a future ability to transmit localized weather reports and local information including but not limited to sea ice conditions, waves and currents and marine mammal and endangered species observations. There is an increased need for environmental awareness that provides decision-makers with a better understanding of coastal hazard mitigation, ecosystem and climate trends and monitoring water quality.

Resources Needed

Fiscal – Investment needs are currently unclear, and will depend on 1) increase in basic infrastructure and 2) need for increased data management.

Leveraged – Both MXAK and AOOS have structures that allow outside investment, whether through members or user groups. The cruise ship excise tax funds could be leveraged to support integrated systems for safe navigation.

Partners – State – DEC, DFG, Alaska State Troopers, Alaska National Guard, DCCED, DMVA; Federal – USCG, USARC, NOAA, DHS; Other – local government, subsistence users, Alaska Native organizations, industry.

Execution

The Marine Exchange of Alaska, (MXAK), has a sustainable organizational and methodological framework that aligns well with state of Alaska priorities. Continued state investment and attention to growth opportunities will deliver results. The Alaska Ocean Observing System, (AOOS), is a major partner of MXAK and is similarly providing a valuable service in cooperation with a broad and diverse group of participating agencies and organizations. In each case the state has an opportunity to increase engagement, provide additional input and work more closely with international, federal partners and the private sector to manage communication information more effectively. A review should be conducted of the Great Circle Route and Bering Strait traffic.

Legislative Actions

1. Compile and review state agency maritime traffic and environmental data and collection processes, as well as data sharing and open data policies to better understand cost-benefit relative to Arctic priorities.
2. Consider future legislation that responds to any identified gaps in current capacity, such as common repositories and quality control, or prioritization of expansion
3. Identify information needed for future state decision making and develop plan for acquiring information.
4. Convene a mariner information working group to ensure benefits meet mariner needs
5. Strengthen support for the Marine Exchange of Alaska and Alaska Ocean Observing System.
6. Track and intervene if necessary on the possible closure of the NOAA weather station in the Aleutians.
7. Support and evaluate implications of the recommendations from the Aleutian Islands Risk Assessment.

Evaluation

Success will be evaluated based on: 1) increase in data collection and use; 2) increase in resource manager and mariner confidence in data available; and 3) increase in industry participation.

RECOMMENDATION 2D

Facilitate and secure public and private investment in support of critical search and rescue, oil spill response and broader emergency response infrastructure.

Lead: Department of Military and Veterans Affairs

Justification

The Arctic Council's Arctic Marine Shipping Assessment (2009) and the CMTS U.S. Arctic Marine Transportation System: Overview and Priorities for Action 2013 identify and recommend addressing the infrastructure gap related to Arctic marine transportation. More recently, and importantly, the eight Arctic nations have signed agreements, facilitated by and convened under the auspices of the Arctic Council, that respond to search and rescue activities, as well as oil spill response. Both publications reference a set of obligations each nation has to maintain a minimum infrastructure and response capacity. Alaska communities bear the brunt of risk associated with increased marine activity, from shipping through the Bering Strait to offshore development in Russia or the U.S. Clearly, the U.S. has a responsibility in this area, and Alaska can play an active role in the interests of facilitating economic development, promoting human safety and protecting the environment. Strengthened response capacity provides a good argument for offshore resource development. Nearly 90% of Alaska's population lives on or near the coastline and depends on access to safe and affordable marine transportation. Thus, marine transportation safety should be a fundamental priority for the state of Alaska and the nation.

Resources Needed

Fiscal – This has the single highest potential for state investment and should be approached strategically, considering a phased or scaled approach.

Leveraged – The federal government has the lead in much of this, as an obligation as an Arctic nation and in the national interest, and should be pressured to appropriately fund its priorities.

Partners – State – AIDEA, Alaska National Guard, DEC, DOT&PF; Federal – USCG, DOT, CMTS, DHS; Other – MXAK, UAF

Execution

The Alaska State Legislature has made significant headway to begin addressing this issue through AIDEA investment. That will need to be carefully coordinated with the DEC and DHS, as well as with other federal partners, to ensure successful implementation that results in direct state funding and/or public-private partnerships that address further development of telecommunications, coastal infrastructure, maritime assets and aviation infrastructure and assets. Specific attention should be on support for icebreaker(s) in Arctic waters and a WX C-130 size aircraft hangar(s) on the North Slope.

Legislative Actions

1. Convene committee review of status and plans for port, hangar, communications and other Arctic infrastructure projects.
2. Encourage AIDEA's careful selection of priority investments, including as they relate to economic development opportunities and/or human safety and environmental protection.
3. Facilitate streamlined regulatory or permitting processes that navigate local, state and federal processes and recognize that authority and jurisdiction may be different for each project.
4. Demand federal action on icebreaker investment to ensure national security and interest, as well as stewardship of the Arctic region.

Evaluation

Success will be measured by: 1) increased number of response assets placed in the Arctic region; 2) expanded marine infrastructure; 3) increase in cached search and rescue, and oil spill response, supplies and equipment; and 4) increased public confidence in maritime operations and the ability of an Arctic nation and state to respond.

RECOMMENDATION 2E

Assure the state of Alaska Spill Prevention and Response Programs have sufficient resources to meet ongoing spill prevention and response needs in the Arctic.

Lead: Department of Environmental Conservation - Spill Prevention and Response

Justification

The state of Alaska Spill Prevention and Response Division, (SPAR), in the DEC has broad statutory authority to require spill prevention measure and response capacity for oil exploration, production, storage and transportation on state land or in state waters. SPAR also oversees the cleanup of contaminated sites by responsible parties. SPAR's operating budget for this and related work is largely funded by legislative appropriations from the Oil and Hazardous Substance Release Fund. With declining production, and no overall increase in the amount of the surcharge, this surcharge cannot support SPAR's work at its current level, much less cover new demands that will arise in the Arctic from anticipated energy exploration and production, marine transportation and tourism. Although many of these new activities will take place in federal waters, potential spills would likely impact state waters and lands. Further, these new activities in federal waters will spur other activity on state lands and waters, such as development of ports, camps, pipelines, fuel storage and other infrastructure, which could also be a source of spills. SPAR routinely collaborates with interested communities to lower the risk of spills, including local input on spill prevention and contingency plans, building local capacity to respond to spills and local participation when a spill occurs.

Resources Needed

Fiscal – Current funding is adequate for current needs but increased funding will be needed for increased operations, planning, and response purposes.

Leveraged – EPA and USCG are partners in subarea planning. Garnering more industry involvement may provide financial support for sub-area planning work.

Partners – State – DMVA; National – USCG, EPA, DOD, RRT, NOAA; Other – OSROs, Alaska Native organizations and companies

Execution

The Governor should make this a priority. The state of Alaska has a functioning and effective spill response planning and response program that needs to be maintained at current levels to support increased resource development. SPAR should be adequately funded so that it can have a robust public education and awareness campaign that encourages stakeholder engagement, involves communities and stakeholders through subarea planning and provides local response training to maintain local spill response equipment to ensure timely, effective and safe response efforts. The Alaska State Legislature should respond accordingly and include this funding request in its budget discussions, working at the same time to identify alternative funding mechanisms. Working with EPA and USCG, SPAR needs to expand subarea planning efforts. One method to improve industry and community involvement would be the development of a drill and exercise schedule for the region. Currently drills are company-specific rather than regionally-focused which results in inefficient and costly duplicative efforts. During an actual event, all resources within an area would likely be called upon. SPAR's continued involvement in international fora and with federal agencies with Arctic jurisdiction, such as the USCG, EPA and the DOI, will be key to assuring good environmental performance and protection of the Arctic. Much of the marine traffic that passes by Alaska is in "innocent passage" and not subject to federal or state jurisdiction. Only by working through the IMO and similar bodies can the state advocate for adequate international measures.

Legislative Actions

1. Invite testimony from the DOS and USCG on the Arctic Council's Agreement on Cooperation on Marine Oil Pollution, Preparedness and Response in the Arctic, and assess its impact.
2. DEC and federal agencies can conduct town hall meetings to inform Alaskans of subarea planning and to shift drill and exercise planning to the subarea plan and engage them in a more regional effort.
3. Review similarly structured and successful sub-national spill response programs to look for best practices.
4. Consider reliable alternatives in order to fully fund the prevention account and program.

Evaluation

Success will be evaluated by: 1) sustainable funding for prevention and response planning; 2) increased public and industry participation in subarea planning; 3) increased public confidence in the state of Alaska's oil spill planning, preparedness and response; and 4) adequate response activity during an event.

RECOMMENDATION 2F

Strengthen private, public and non-profit oil spill response organizations to ensure expertise in open water, broken ice, near shore and sensitive area protection; be able to meet contingency plan requirements and operate effectively in the Arctic.

Lead: Department of Environmental Conservation - Spill Prevention and Response

Justification

Oil Spill Response Organizations (OSROs) are membership based nonprofit organizations that fulfill compliance obligations for companies operating on land and in or near the US maritime environment. Their sole purpose is to provide oil spill response capacity to those companies, thereby reducing liabilities and responding to state of Alaska and U.S. environmental regulations. OSRO capacity is relegated to the types of activities occurring. Without production in open water at this time, there is no OSRO with the ability to adequately respond to offshore incidents. Vessels in innocent passage, (not visiting a U.S. port), are not required to comply with state or federal laws, have membership in a local OSRO or have their own response capacity. Beyond OSROs, the state should explore ways to strengthen the capacity of oil spill response organizations, including private sector companies or other mechanisms.

Resources Needed

Fiscal – Participation in OSROs would incur a membership fee, which should be considered an additional investment in oil spill response capacity. Investment could also be considered for other mechanisms outside the OSRO structure.

Leveraged – Private sector assets, Coast Guard activities and increased attention to the Arctic.

Partners – State – DMVA, local governments; National – USCG, EPA, DOD, RRT, NOAA; Other – OSROs, Alaska Native organizations or companies, Alaska Maritime Prevention and Response Network, ASRC Energy Services Response Operations.

Execution

In addition to continued support of the DEC's ongoing communication with the USCG in reviewing alternative compliance programs development and applications, the state of Alaska should consider new ways of interacting with oil spill response organizations. If the state were to join an OSRO, for instance, this could provide a more equitable distribution of resources and ensure increased response capacity in specific regions of concern (i.e.; the Aleutians and Bering Strait). As a member, the state would move beyond regulation of OSROs to a partnership, developing a more strategic relationship that should result in heightened spill response capability. State participation in oil spill response organizations could also result in strengthened ability to gather data and fundamental science on ecosystems – ocean stratification, ocean current movements and ice formation – which will be critical to understanding and responding to an incident.

Legislative Actions

1. Explore current database availability and functionality as they relate to effective emergency response, such as concentration of sea ice, locations of ports and vulnerable environmental resources (AMATII, Arctic Portal, Arctic ERMA, AOOS, MXAK).
2. Ask the Attorney General for an opinion about the state membership in OSROs.
3. Alaska Maritime Prevention and Response Network should work toward coordination between public, private and nonprofit efforts.

Evaluation

Success will be measured by: 1) the increased capacity of oil spill response organizations to respond to a potential or real oil spill; and 2) public confidence in oil spill planning, prevention and response.

RECOMMENDATION 26

Ensure that a variety of response tools are readily available and can be deployed during an oil or hazardous substance discharge or release.

Lead: Department of Environmental Conservation - Spill Prevention and Response

Justification

When faced with an oil spill incident it is imperative to have a variety of resources readily available. The best tool is determined by a variety of factors including type of oil, location of spill, and weather conditions. While mechanical recovery is always considered ideal, in some cases it may not be possible. Dispersants and in-situ burning are important secondary response tools in the Oil Spill Toolbox. State statutes require companies to contain or control and clean up oil discharge. New technologies and products are in development such as herding agents that consolidate dispersed oil, increasing the mechanical recovery. There is significant research showing that dispersants are effective in cold waters and that the oil produced in Alaska responds favorably to dispersants. One particular hindrance is that Alaska is the only coastal U.S. state without statewide preauthorization of dispersant use for oil spills. Dispersant pre-approval in Alaska should be based on sound science, including research on fates and effects of chemically dispersed oil in the Arctic environment, experiments using oils that are representative of those in the Arctic, toxicity tests of chemically dispersed oil at realistic concentrations and exposures and additional measures. All response tools should be available and considered during a spill. The State should work with its federal partners and industry to test and develop response tools such as dispersants and in-situ burning for an Arctic response scenario before an event occurs so that their effectiveness and safety are well documented before they are needed.

Resources Needed

Fiscal – Current funding is adequate for planning and policy development purposes but increased funding will be needed for implementation

Leveraged – USCG and EPA are already collaborating on efforts to establish preauthorization guidelines along Alaska's coast; these partnerships should continue.

Partners – State – DMVA, local governments; National – USCG, EPA, DOD, RRT, NOAA; Other – OSRO, Alaska Native organizations or companies, Alaska Maritime Prevention and Response Network.

Execution

Through sub-area planning, the state, EPA and USCG should discuss various response options and the risk/benefit analysis that is utilized when deciding response options. The DEC, USCG and the EPA are currently working on amending the preauthorization areas for dispersant use along the Aleutian chain and the Gulf of Alaska, which will replace the current patchwork of preauthorization zones. The Arctic is not being considered for preauthorization at this time. Subarea plans in the preauthorized zones will be taking the additional step of identifying environmentally important areas, including critical spawning and other wildlife habit where dispersants should be prohibited. Decision trees for dispersant use are employed after coordination with members of the Alaska Regional Response Team, federally recognized tribes and other stakeholders. Current processes and policies should be employed to examine the feasibility of preauthorization for dispersant use along Alaska's entire coastline.

Legislative Actions

1. Invite testimony on the feasibility and need for dispersants and other non-mechanical response tools along the Alaskan Arctic coastline and the process for approving, testing, evaluating, monitoring and reporting use.
2. The Legislature should review oil spill response planning statutes and ensure they allow and encourage the development of effective response tools.
3. Work with the USCG and DEC on designation of port of refuge in Bering Straits; and follow with the development of an emergency mooring system.
4. Purchase and distribute Emergency Towing Systems and stage in the Arctic region.
6. Support requirements for crude oil shipment companies that operate in waters near the state to store supplies of dispersants. Require shipment companies to deploy dispersants within seven hours following an approval for use decision.
7. Support the sub-area planning effort to identify sensitive areas.

Evaluation

Success will be evaluated: by 1) increased public confidence in the state of Alaska's oil spill planning, preparedness and response; and 2) clear preauthorization plan in place for use of dispersants and other non-mechanical response tools in Arctic waters.

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RECOMMENDATION 2H

Foster and strengthen international partnerships with other Arctic nations, establishing bilateral partnerships with, in particular, Canada and Russia, to address emerging opportunities and challenges in the Arctic.

Lead: Office of International Trade

Justification

Alaska has been an active participant in international Arctic relations throughout its history. This has occurred through business activities, (CH2M Hill's Sakhalin project, or Teck's investment in Red Dog), environmental issues, (DEC's active communication with Canadian territories and provinces), policy, (through the Northern Forum, for a time), and as part of the US delegation to the Arctic Council, where Alaska contributes its knowledge and expertise to projects of the Working Groups or Task Forces. While international relations are the domain of the U.S. government and DOS, Alaska's strategic location as part of the Arctic necessitates a good working relationship with its neighbors. Especially important will be how Arctic shipping through the Bering Strait, and offshore development in Russia and Canadian waters, have an impact on Alaska's environment and communities. The ability to ensure safe operations and to mitigate risk will be the thrust of the two bilateral relationships, which may be expanded to account for a sharing of best practices and joint infrastructure development.

Resources Needed

Fiscal – Potentially some additional travel funding, but basic communications are fairly cost-neutral.

Leveraged – There are a number of international forums for dialogue whereby state of Alaska participation could guarantee additional relationship-building. Further, through federal programs, the state could develop partnerships in these areas.

Partners – State – DCCED, DEC, DF&G, DNR, DMVA; National – DOS, USCG, DOD, NOAA, NSSI; Other – Northern Forum, University of the Arctic, PNWER, World Trade Center, ICC, AIA, AAC, GCI, AK Chamber of Commerce, Kawerak, Alaska Marine Mammal Coalition.

Execution

The Governor's office should engage in a campaign to strengthen, renew or initiate the state's international partnerships. The scale this effort requires depends on available resources and alignment of interests, but fact-finding missions to both Canada and Russia could assist. Additionally, Alaska would benefit from participation in Arctic Council activities, international Arctic conferences such as Arctic Frontiers (Norway), Arctic Circle (Iceland), and the Arctic: Territory of Dialogue (Russia). The state of Alaska should also consider reengaging with the Northern Forum as a full member.

Legislative Actions

1. Convene hearing related to current bilateral or international relationships, with testimony from all state agencies and associated organizations.
2. Assess current capacity of state agencies or the Governor's office to engage internationally and expand as necessary.
3. Invite testimony from Arctic Council Permanent Participants, or Northern Forum members, to better understand the value that relationship might bring.

Evaluation

Success will be measured by: 1) increase in international engagements by state officials; 2) increase in public awareness/ confidence in bilateral working relationships; and 3) increase in knowledge about Russian and Canadian activities and infrastructure in the Arctic.

Strategic Line of Effort #3 – Support Healthy Communities

Increasing changes and activity in the Alaskan Arctic are likely to hold enormous implications for the health and well-being of inhabitants of the region as socio-economic systems react, additional stress is placed on both existing and future infrastructure and global processes impact local planning. While there is a strong link between vibrant economies and healthy communities, socio-economic and environmental factors that lead to healthy communities can have a huge impact mitigating adverse health impacts that may emerge in the future.

In an increasingly busy Arctic, it is critical that Alaska continue to utilize transparent public processes that engage stakeholders, lead to informed decision making and hold decision makers accountable. To employ these processes will require trans-jurisdictional coordination and cooperation among all levels of government – international, national, state, local and tribal – with clearly-defined functions and roles. To achieve this requires a balance of multiple values to protect, promote and enhance the well-being of the Alaskan Arctic including the people, flora, fauna, land, water and other resources. Much of this is already in place.

Local governments with active resource development within their boundaries work collaboratively with the state and industry to support and sustain the communities in their region. This collaborative effort ensures that rural development includes protections for subsistence resources, cultural identity and lands, while providing needed infrastructure, services and employment training opportunities.

The justification for addressing Arctic issues is not only to better understand increasing changes taking place or human activity in the region, but to recognize the historical and current presence of Arctic peoples, with corresponding needs to enjoy a quality of life consistent with and responding to national standards, traditional ways of living and a remote Arctic environment. With increased attention to the Arctic, local communities should see corresponding workforce development, revenue sharing, and access to affordable energy and transportation.

With sound economic opportunity for Alaskans, the state can build a vibrant economy, driven by private sector growth and a competitive business environment that has the potential to deliver social benefits while responding to the needs for a healthy environment. The state of Alaska can seek a better quality of life for the whole Arctic region without compromising the economic security and well-being of other communities or the state as a whole; healthy marine and terrestrial ecosystems; or effective governance supported by meaningful and broad-based citizen participation.

RECOMMENDATION 3A

Foster the delivery of reliable and affordable in-home water, sewer, and sanitation services in all rural Arctic communities.

Lead: Department of Environmental Conservation

Justification

Economic stability and opportunities have profound effects on the social characteristics and health of a community. In all eight Arctic nations, where distance and geography mean remote communities often face difficult living conditions, governments, communities and the private sector are working to implement effective and affordable delivery of public services. The state of Alaska is well-positioned to take an innovative and results-driven leadership role in the circumpolar region. As a primary leader the state will seek to address DEC's estimation that it would cost $300 million to provide running water and sewer to all unserved homes and an additional $427 million to upgrade and replace aging infrastructure with at high risk of failure. Often multiple generations of families share housing. Overcrowding contributes to water rationing and increased health risks.

Resources Needed

Fiscal – Sustain or increase funding for DEC's Water and Sewer Challenge.

Leveraged – Support efforts of the Alaska Rural Water and Sanitation Working Group.

Partners – State – Alaska State Legislature, AHFC, DCCED-DCRA, DHSS; Federal – EPA, HUD, Denali Commission, IHS, USDA, CDC, NREL, DOE, DOI, USARC; Other – RurAL CAP, engineering companies, utilities, ANTHC.

Execution

DEC will coordinate state actions, working with other agencies, including federal agencies, to drive this effort. The effort will entail searching for best practices from around the Arctic and working with regional nonprofits to determine priority criteria and deliver new approaches to the Alaskan Arctic. DEC's Alaska Water and Sewer Challenge is an innovative approach that can provide clearer insight into Arctic-specific needs and solutions. Basic water data, an understanding of how the water supply is changing and the fundamental process of changing permafrost systems is also warranted. Public education and outreach is needed to convey the important connections between water provision, (both quality and quantity), and health in rural Alaskan communities.

Legislative Actions

1. Continue support of the DEC's "Alaska Water and Sewer Challenge."
2. Improve public education and outreach regarding the connections between water use and health.
3. Augment funding to replace aging and failing water and sanitation infrastructure.
4. Support and provide additional funding to programs for technical service providers.
5. Re-examine efforts such as the Local Utilities Management Program (LUMP) and the Alaska Rural Utility Collaborative (ARUC) as models for a state-federal partnership approach that would focus on providing an allocation to incentivize improved operation and maintenance and protect investments in rural water and sanitation infrastructure.
6. Support an analysis of the remaining unserved communities to determine where it is feasible to be served by piped water and sewer service, and report on the barriers that are preventing this service.
7. Identify and evaluate approaches to reducing piped water and sewer construction costs to make sanitation projects more economically viable.

Evaluation

Success can be evaluated by: 1) whether the overall sanitation and related health effects have improved in communities where solutions have been applied, relative to communities where they have not; 2) community members' opinions about whether needs are better met with new or redesigned infrastructure or technology; and 3) the associated capital, operations and maintenance costs have been reduced.

RECOMMENDATION 38

Reduce power and heating costs in rural Alaskan Arctic communities.

Lead: Alaska Energy Authority

Justification

Economic stability and economic opportunities have a profound effect on the social stability and characteristics of a community. In the Arctic, energy prices have an outsized and interconnected effect on these two issue areas. The communities that derive their power from stand-alone grids have, to a large degree, similar negative economic outlooks. Arctic communities simultaneously suffer from joblessness and decreasing amounts of public support. High energy costs discourage private investment, which in turn creates high unemployment and social dependence. While not solely an Arctic issue, addressing the energy needs of Arctic communities is a critical and fundamental first step to supporting their economic and social well-being. Applied and basic research is an underutilized or undeveloped resource that Alaskans need to be able to count on to develop new solutions to the challenge of remote power and heat, through identification of emerging energy technologies, increased efficiencies, or leveraged resource development infrastructure. Communities have a practical capacity that can be leveraged, such as the wind energy program in Kotzebue. Emphasis should be on cold-weather design and engineering, exploration of local and/or renewable sources, and integrated systems; as well as to investigate alternative approaches that are less costly to build, operate and maintain housing and utilities in Arctic communities. Diversifying energy sources and supporting innovation that translates to practical application will help promote the development and maintenance of affordable and safe housing, including working with interested parties within the United States and other Arctic nations to investigate alternative approaches that are less costly to build, operate and maintain housing and utilities in Arctic communities.

Resources Needed

Fiscal – Sustain and/or increase investment in the Emerging Energy Technology Fund, Renewable Energy Fund and select capital projects.

Leveraged – Plan for future funding of implementation, either as part of a pilot project, public-private partnerships, or international collaborations.

Partners – State – Alaska State Legislature, AHFC, DCCED-DCRA; Federal – Denali Commission; NREL, DOE, DOI, USARC; Other – RurAL CAP, engineering companies, utilities, ANTHC, ACEP, CCHRC, REAP.

Execution

Alaska can address basic needs by promoting energy efficiency and supporting and funding energy efficient upgrades and renewables. Increasing the energy efficiency of current systems and researching alternative sources of energy will decrease diesel fuel use helping to address the immediate infrastructure needs and diesel fuel dependence of many small Arctic villages. The state should also support research that explores innovative alternative solutions for adequate housing through reducing construction costs and increased energy efficiency in housing in the Arctic environment. The AEA has a very broad and under-resourced mandate to address the energy needs of Alaskan communities. AEA should convene a working group that will examine the state's research capacity of the public-private network. This network could research and develop new energy technologies that address affordability and efficiency. Simultaneously, AEA should consider launching an energy X-prize competition that would stimulate real-world applications of research to an Arctic environment.

Legislative Actions

1. Provide immediate funding to facilitate more efficient existing energy infrastructure.
2. Committee hearings should invite energy researchers to present findings on new and emerging energy technologies and processes and facilitate coordination of interdisciplinary partnerships.
3. Consider funding an X-prize energy competition that will create an incentive for long-term energy solutions.

Evaluation

Success will ultimately be measured in the direct and indirect reduction of the cost of heating and power costs in the Alaskan Arctic. However, in the medium term, this effort should be evaluated by 1) funding energy efficiency programs for existing energy infrastructures; 2) an increase in university, state agency, and private sector collaboration that leads to more applied research; and 3) an established and stable funding stream available to address challenges such as renewable energy.

RECOMMENDATION 3C

Support long-term strategic planning efforts that leverage existing methods, synthesize past work and strengthen local planning that assesses and directs economic, community and infrastructure development, as well as environmental protection and human safety.

Lead: Department of Commerce, Community, and Economic Development - Division of Community and Regional Affairs

Justification

To address complex issues of change and activity in the Arctic, long-term planning processes must be strengthened or developed. This could be achieved by encouraging local communities to contribute knowledge, prioritize challenges and opportunities and assist in the development of approaches or solutions. Long-term strategic planning should be conducted in collaboration with state and federal officials who, in concert with local subject matter experts – who bring comprehensive planning and Comprehensive Economic Development Strategies (CEDS), as well as other valuable planning efforts – explore and evaluate long-term scenarios and objectives. In order to better integrate these individual plans and to contribute to broader regional strategies in the Alaskan Arctic, the state should encourage more robust strategic planning that assesses and supports new infrastructure and resource development opportunities. An effective coordinated planning strategy will effectively leverage limited resources, avoid duplication of efforts and deliver socio-economic benefits to Alaskans. Additionally, this can lead to more effective environmental protection and human safety, providing a baseline assessment of current conditions, monitoring cumulative impacts of human activity and assisting land and resource managers.

Resources Needed

Fiscal – Competitive grant to DCCED for agency staff to review and compile a region or sub-regional plan; anticipate and plan for future needs related to planning efforts.

Leveraged – Fortunately there are existing studies, reports, CEDS and transportation plans that can be used to assist in this effort. Additionally, with federal attention on integrated Arctic management, there may be an opportunity for increased federal funding.

Partners – State – DED, DEC, DOT&PF, DNR, AHFC, AEA, local governments; Federal – EDA, DOI, DOE, Denali Commission, USACE, NSSI; Other – Alaska Native tribes, corporations, and organizations; private sector companies; co-management organizations; ARDORs.

Execution

DCCED has a well-established history of economic development planning. As the lead agency, it will be responsible for identifying current efforts and organizing a structure for producing region-wide plans. Examples of plans worth considering in this effort include: AEA's regional energy planning, DEC's sub-area planning, NSSI Scenario Planning, local Planning Commissions and DNR's North Slope Plan for state lands and resources. DCCED will also coordinate with other state agencies and the federal government to leverage interest and evaluate collaboration, as well as the impact of state-federal or state-local interaction and produce a recommendation for best practice. DCCED Division of Economic Development's ARDOR program currently addresses some regional economic development planning in the state, which can be more closely tied to community comprehensive planning. There is a huge need for planning funds and technical assistance support for local governments, as well as complementary funding to DCRA to provide meaningful planning support. Additionally, the state will engage with IASC and/or the SCoR to determine the best approach for assessing and mobilizing the scientific community both across the state and internationally.

Legislative Actions

1. Request that DCCED assess previous work and current planning efforts, and fund, as necessary.
2. Review framework for region-wide comprehensive planning that acts as synthesis of existing plans.
3. Consult with local governments to determine effectiveness of current programs and/or opportunities for increased stakeholder engagement beyond legislative process.
4. Consider providing planning funds and technical assistance support for local governments, as well as complementary funding to DCRA to provide meaningful planning support.
5. Consider additional resources devoted to data management, access, integration and visualization.

Evaluation

Success will be evaluated by: 1) reduction in duplication and increased engagement between agencies, communities and organizations; 2) stabilized and/or growing economic performance; 3) development of a strategic plan related to environmental change and assessment; and 3) a Legislature more informed about cumulative impacts of human activity in the Arctic.

RECOMMENDATION 30

Anticipate, evaluate and respond to risks from climate change related to land erosion and deterioration of community infrastructure and services and support community efforts to adapt and relocate when necessary.

Lead: Department of Commerce, Community, and Economic Development and Department of Environmental Conservation

Justification

Alaska has been on the front lines of climate change for nearly a decade, as work conducted by the Climate Change Sub-Cabinet demonstrates. With the Arctic experiencing change at twice the global average, Alaska's communities and peoples are faced with new and significant challenges and have a need to immediately react. It is critical to make swift decisions and apply innovative solutions when villages are faced with relocation and survival while they are also considering the economic opportunities of resource or port development. The state and nation have an obligation to focus on local adaptation measures that help communities better understand risk and prevent erosion. Erosion revetment ensures that pro-active preventive steps are taken while preparing for longer term adaptation to climate changes. Two elements are central to this effort: the building of human and organizational capacity to adequately move forward and built infrastructure investments that relocate or stabilize existing structures. Ensuring a direct response to the state's most vulnerable resources – its people – during a period of climatic uncertainty and variability, will be of paramount importance.

Resources Needed

Fiscal – This will require increased capital spending, either for village relocation, erosion mitigation or structure stabilization.

Leveraged – Federal agencies will have a primary role, often, in funding and facilitating the response to climate-associated risk.

Partners – State – AIDEA, AHFC, local governments, DNR-DGGS, DOT&PF; Federal – Denali Commission, USACE, DOI, FEMA, NOAA; Other – AOOS, RurAL CAP, Alaska Native regional nonprofits, CCHRC.

Execution

DCCED's Risk MAP program is a good start to identifying and prioritizing risk, though as a FEMA-funded project it is very specific in the communities it can include. DNR-DGGS has a Climate and Cryosphere Hazards Program, (CCHP), that was developed to asses geologic hazards associated with climate variability and change and to publish information that can be used for forecasting and proactive planning, hazard mitigation, and emergency response in high-risk communities and developing areas. DEC can provide a lot of expertise on the topic, and both entities can work with federal agencies to assess future investment needs. Resources provided through DCRA's Alaska Climate Change Impact Mitigation Program, (ACCIMP), can help imperiled communities by funding two types of projects: 1) Hazard Impact Assessments and 2) Community Adaptation Plans. However, when immediate action is necessary the Governor, Legislature and/or federal government will need to have dedicated resources and capacity to address needs. The associated costs of response are too high to address alone or without commitment from all levels of government and in particular those in high level positions. There are communities, such as Newtok, that have plans for relocation but they cannot be implemented until they receive funding.

Legislative Actions

1. Expand DCCED Risk MAP program and partner with communities who are ready to take action.
2. Conduct high resolution mapping of communities and surrounding landscapes for the development and deployment of evacuation plans in areas where river and coastal flooding are regular occurrences or are likely to occur in coming decades. Prioritize communities currently threatened.
3. Encourage cross-agency collaboration, perhaps through a reconvening of the Climate Change Sub-Cabinet.
4. Convene committee hearings with public testimony by local communities, tribal and local government.
5. Request an annual report to the Legislature on those communities of imminent concern to monitor progress.
6. Request that federal agencies designate a single coordinating agency and identify a designated funding stream that will be responsive to climate change impacts requiring community relocation.
7. Increase support to state of Alaska agencies so they can adequately evaluate their programs and goals against the recommendations made by the Alaska Climate Change Sub-Cabinet.
8. Map the history of storm surges and other natural disasters and evaluate capacity to respond.

Evaluation

Success will be measured by: 1) relocation of highest priority communities; 2) risk mitigation measures implemented in the next level of prioritization; and 3) state-federal investment leveraged effectively for greatest efficiency of effort.

RECOMMENDATION 3E

Develop and support public education and outreach efforts that (a) enhance the understanding of Arctic conservation including biodiversity and the sustainable use of biological resources and management of natural resources and (b) promote public participation in development of fish and wildlife management plans within existing management systems and policies.

Lead: Department of Fish & Game

Justification

Alaskans depend on healthy ecosystems with access to and the ability to harvest natural living resources like fisheries or wildlife. For some, this may be recreational; to, others it is an economic necessity. For Alaska Natives this is a cultural priority. Alaska has a constitutional obligation, too, to ensure these resources for use by future generations. However, the ecosystems upon which Alaskans depend are often not completely understood, especially as they relate to fish and wildlife productivity and abundance or management processes. A baseline assessment of fish and wildlife resources, as well as a tracking of trends and factors that drive change, informs the public of natural living resource availability and harvest strategies. Alaskans' observations and understanding of both strategies are important contributions to sustainable, adaptive management approaches and allow them to make informed decisions. Increased public education and outreach efforts will contribute to a more knowledgeable and interested public. Education will also highlight who is interested in and knowledgeable about the benefits to Alaskans of natural living resources and the environment, biodiversity of a healthy ecosystem, as well as threats to that health. Public awareness should include species, habitats, ecosystem structure, processes, functions and stressors. Additionally, education programs should address the interplay between humans and ecosystems, the dynamism in naturally occurring processes and those that fall outside natural variability.

Resources Needed

Fiscal – Support expansion of DF&G education and outreach programs and collaborations with local and regional entities, perhaps through a grant competition open to eligible applicants.

Leveraged – There are multiple state, national and international efforts underway, so process should focus on highlighting current practices and research, integrating cross programs and linking to K-12 education.

Partners – State – DNR, DEC, Board of Fish, Board of Game, local governments, Alaska Congressional Delegation; National – NOAA, DOI, NPRB, NMFS, NSSI; Other – NPFMC, CAFF, AOOS, Alaska Sea Grant MAP.

Execution

Use the Alaska Joint Boards of Fish and Game advisory committee process to promote local participation and constructive input to state fish and wildlife management plans. DF&G should continue to participate in existing federal management activities to promote sustained yield management and use. DF&G should continue to build outreach and education programs and encourage collaborative research and management projects and prioritization with land owners, local or regional governments, tribes and other user groups. A grant competition could be funded via request to the Legislature in the next budget cycle or otherwise identify a funding and organizational mechanism for this to occur. The grant competition should prioritize grantee knowledge of and responsiveness to Alaskan experts and expertise. Additionally, the successful grantee should have strong relationships with local government and industry partners who can contribute their science and research as well as stakeholder engagement. Many individual efforts are ongoing in Alaska and new networks should build on resources such as: Upward Bound, the Marine Advisory Program, Cooperative Extension coursework, ANSEP and Alaska Resource Education.

Legislative Actions

1. Review locally-driven subsistence mapping projects through invited testimony.
2. Review baseline assessment needs of fish and wildlife resources, as well as a tracking of trends and factors that drive change and inform the public about availability and harvest strategies. Ensure that consideration is given to Alaskans' observations, including local and traditional knowledge.
3. Work with local communities, landowners, ANCs and tribal groups to identify and prioritize projects.
4. Consider DF&G budget request for grant competition.
5. Enhance the Alaska Joint Boards of Fish and Game advisory committee process to promote local participation and constructive input to state fish and wildlife management plans.

Evaluation

Success will be measured through an increase in public awareness of these issues, possibly through a poll for current state of knowledge.

RECOMMENDATION 3F

Enforce measures that protect and help us better understand the food security of Arctic peoples and communities.

Lead: Department of Fish & Game

Justification

Environmental shifts taking place in the Arctic such as weather variability, changing ice freezing patterns, more frequent and intense storms, higher temperatures, decreased sea ice extent and stability combine to produce an unpredictability to long- established hunting, fishing, and gathering harvest patterns. Access to food resources and ability to adequately store these foods is uncertain and raises risks from toxins and emerging diseases. These concerns occur in communities that are paying some of the highest energy and food prices in the world. Food security, however, must be considered as more than ensuring communities are free from hunger, or ensuring affordability and accessibility. In the Arctic, for indigenous peoples in particular, food security is a fundamental priority that extends to cultural and environmental or economic health. While economic and resource development activities will address one portion of socio-economic concerns, they cannot displace cultural dependence on the living resources of the region. With this in mind, future assessment, monitoring and development activities will need to support local needs for food safety and ecosystem health. Greater awareness of factors affecting traditional food abundance, access, use patterns and the cultural component of food security demands will be important. Additional opportunity to reinforce local traditional food access could include active management programs that expand or introduce populations. The Arctic region is rich in healthy natural range habitat for ungulates. This habitat could support additional introduced animals such as reindeer, musk ox, and bison.

Resources Needed

Fiscal -- Strengthen capacity within DF&G's Division of Subsistence to respond to food security concerns.

Leveraged -- Increased cooperation and communication between state and federal agencies, local government and Alaska Native organizations should result in effective promotion of food security without additional resources being needed. Canada has done extensive work on food security and this would be a good opportunity to collaborate.

Partners -- State -- DNR, DCCED-DCRA, DHSS, local governments, Alaska State Section of Epidemiology; National -- NOAA, DOI, CDC, NIH; Other -- Arctic Council; ICC; AIA; Alaska Native tribes, corporations and organizations; University of Alaska, ANTHC

Execution

DF&G has existing protocols in place to address food security concerns and has decades of experience ensuring the sustainable yield of living natural resources. It can provide a leadership role in increasing collaboration between agencies and organizations with interests in fish and wildlife management and harvest assessment programs. The state will facilitate efforts to ensure subsistence activities are supported for Arctic residents. Other state agencies have a role to play here; in particular the Alaska State Section of Epidemiology has a program in place to assess the health benefits and risks of subsistence food consumption. Within DF&G's Division of Subsistence, as one option, the state should consider forming a Committee on Cultural Habitat, which would reinforce the eco-cultural relationship found within food security. A program such as this, or similar, would allow the state to manage not just for the health of the subsistence resource but also for access to that resource by indigenous peoples who depend on it for cultural well-being.

Legislative Actions

1. Invite regular testimony in committee hearings to assess the sustainable management of local marine and terrestrial subsistence animals, fisheries, and flora.
2. Consider a food security policy as it relates to the cultural health of indigenous peoples and all Alaskans.
3. Form a Committee on Cultural Habitat within the Division of Subsistence.
4. Explore solutions to limitations on serving locally harvested food in schools and public service buildings.
5. Support DF&G programs that support access to and harvesting of subsistence foods and with the participation of local and indigenous peoples, continue to support the development of a cohesive and comprehensive Arctic wildlife policy, including the identification and assessment of climate-related impacts and threats at the community level.
6. Continue to fund science studies on food security, including continued research on contaminants.
7. Support UAF School of Natural Resources and Extension program educational training programs.

Evaluation

Success will be measured by: 1) increased attention and agency response to food security issues; 2) improved co-management of subsistence resources; 3) and successful subsistence activities.

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RECOMMENDATION 36

Identify and support industry, community and state practices that promote sustainability of subsistence resources, while protecting against undue ESA listings and broad-brush critical habitat designations.

Lead: Department of Law

Justification

Over the past decade, federal agencies have strived to make Alaska "ground zero" for climate change legislation and regulation. Primarily, those efforts have been evident in ESA listings, which have included the Polar Bear, Bearded Seals, and Ringed Seals. ESA listings and critical habitat designations affect and alter subsistence hunting practices, industry activities and infrastructure development. Unlike other listings in the history of the ESA, these listings have been predicated entirely on modeling and, it could be said, conjecture. Each of the species listed is currently healthy. However, the ESA predicts that climate change over the next century will result in these species becoming threatened and/or endangered. Even ignoring the speculative nature of these listings, the immediate problem is that the ESA will serve to punish Alaskans and the local economy on the basis of issues that, by definition, are global in nature. The state of Alaska must continue to challenge unwarranted ESA listings that will halt economic development and healthy communities. Additionally, Arctic Alaska has numerous examples of balancing environmental protection with development activities. Co-management groups, Red Dog Mine's subsistence committee, and conflict avoidance agreements are all examples of how the state of Alaska can serve as a model to other Arctic nations.

Resources Needed

Fiscal – Support proactive research efforts by the DF&G that can serve to provide the science needed to avoid unwarranted ESA listings. Ensure the DOL has resources needed to challenge unwarranted listings.

Leveraged – Collaborate with Western Governor's Association and others with aligned interests regarding ESA policy.

Partners – State – DF&G, Alaska State Legislature; Federal – Alaska Congressional Delegation; Other – Alaska Native communities, Industry.

Execution

Industry, state and local agencies, corporations and communities can collaborate to determine the best legal and regulatory strategy relative to federal listings. The primary strategy will demand targeted litigation that requires federal agencies act with legitimacy, transparency and candor. Tangentially, state and local regulators should take into account the additional burdens of ESA listings when determining their respective regulatory endeavors. Ongoing, sound scientific research is essential for regulatory agencies, industry, and native communities.

Legislative Actions

1. Ensure funding is available for the DF&G and DOL, as well as outside counsel to continue and pursue proactive research and litigation efforts as necessary.
2. Convene an industry-focused task force that identifies best practices and develops recommendations for public outreach, including to federal agencies and Congress
3. Evaluate state and local government activities that effectively mitigate risks of private sector activity as it relates to subsistence resources.

Evaluation

Success will be measured by: 1) protection of species; 2) fewer litigation efforts; and 3) the health of those industries and businesses that are operating in areas subject to ESA related regulations.

RECOMMENDATION 3H

Create workforce development program to prepare Arctic residents to participate in all aspects and phases of Arctic development.

Lead: Department of Labor and Workforce Development

Justification

Emerging resource development opportunities and the opening of maritime routes will create increased demand for workers in trades such as construction of industrial infrastructure, equipment operations, carpentry and architecture for new structures and housing, food and tourism services, scientific research, as well as other entrepreneurial pursuits stemming from new activities. Many of these activities demand skilled labor and/or post-secondary education including, for example, education for entrepreneurship that capitalizes on an individual's ability to turn ideas into action. Ongoing public investment in construction, infrastructure, and resource development projects in Alaska will require active attention to providing training and educational resources. The largest job growth is forecasted to be healthcare and social assistance, mining, construction and the leisure and hospitality sector. Consideration should be given to all aspects of development projects, including research, monitoring, regulatory oversight, project development, construction, operation, remediation and reclamation, as well as ice navigation, marine mammal observation, spill response, SAR, pilotage, engineering, management and high-level leadership positions.

Resources Needed

Fiscal – Fund DOLWD and/or Alaska Workforce Investment Board (AWIB) agency staff to develop targeted workforce development plan for the northern region.

Leveraged – Federal resources should be applied to Arctic workforce development as an emerging field of study. Additionally, there are numerous programs that could incorporate or co-develop an Arctic training and workforce program.

Partners – State – AWIB; Division of Teaching & Learning Support, Career Technical Education; DOLWD, Alaska's Institute of Technology, ATC; Federal – USCG, USDOL, EDA; Other – APICC; Alaska Marine Pilots; Alaska Native tribes, corporations, and organizations; University of Alaska; Ilisagvik Tribal College

Execution

The state of Alaska has many resources already focused on workforce development -- AWIB, DEED, CTE, AVTEC, ATC, ANSEP. Job and workforce planning will have to incorporate innovative ideas that are applicable to the Arctic and its unique set of challenges - the current Alaska Integrated Workforce Development Plan mentions "arctic" once, in relation to offshore oil fields. AWIB has a history of working with industries to develop targeted workforce development plans. The Construction Workforce Development Plan, Alaska Health Workforce Coalition Plan and the Alaska Maritime Industry Workforce Plan are examples, and continued work could focus on industries important to the Arctic.

Legislative Actions

1. Request that AWIB implement plans already in place, as well as assess current job market for gaps, emerging job markets, such as renewable energy and energy efficiency subsectors and form strategies and priorities for an Arctic Workforce Development Plan that connects the dots between regional plans.
2. Request that AWIB convene a working group to look at education programs that support entrepreneurship all the way from primary school through postsecondary education promoting skills that foster creativity, initiative, and innovation as well as specialized knowledge about business development.
3. Fund, as needed, the work necessary to complete implementation, recurring assessments and updates to develop plan(s).
4. Evaluate current workforce development strategies for effectiveness in rural Alaska.

Evaluation

Success will be evaluated by: 1) lower unemployment rates and increases in the percentage of Alaskans filling available jobs, (versus a seasonal workforce that commutes from out of state); and 2) increase in local entrepreneurs establishing a social or commercial activity.

Strategic Line of Effort #4 – Strengthen Science and Research

Alaska's future prosperity depends in large part on the scientific, technological, cultural and socio-economic research it promotes in the Arctic in the coming years and its ability to integrate science into decision making. Ongoing and new research in the Arctic must be designed to help monitor, assess and improve the health and well-being of communities and ecosystems; anticipate impacts associated with a changing climate and potential development activities; identify opportunities and appropriate mitigation measures; and aid in planning successful adaptation to environmental, societal and economic changes in the region.

The vast amount of science and research conducted in the Alaskan Arctic encompasses a broad spectrum of interests, from the public to the private sector including non-governmental organizations, the state University system and many others. It is crucial that the state of Alaska be involved in the various forums that build the information base available to policy makers. In addition, while local and traditional knowledge and subsistence activities inform many of the above entities' research priorities, activities and findings, regional traditional knowledge must receive a higher level of consideration. How researchers can better collaborate with local people and include traditional knowledge into their projects is receiving more attention.

Observational systems are among the most effective means for monitoring and documenting change, improving inputs to models and informing permitting decisions. They are also a valuable way to meaningfully involve Arctic communities in research activities. Process studies can add to this knowledge and help reveal the forces influencing ecosystem structure and function. In addition, the transfer of findings from process studies to models can reduce uncertainties and improve the accuracy of projections.

While models have practical use in developing strategies for managing wildlife and for sustainable and adaptable communities, civil and economic development infrastructures, it remains necessary to clearly identify the limitations of models that are developed to aid in decision making. Even as baseline data and component parameterizations improve, awareness of these limitations assists the evaluation of contingencies and determination of proper levels of precaution in management and strategic approaches.

State government priorities pertaining to the Arctic are influenced by state objectives. Establishment of these priorities will ensure organized state input to federal, local and institutional decisions on Arctic research and monitoring needs.. As the state's engagement with Arctic issues increases, the executive branch will play an important role in improving coordination of state agencies' positions in Arctic research and associated matters. Alaska should pursue strategies to broaden and strengthen the influence of its agencies, its academic experts and its local governments and associations.

Benefits include an increase in the knowledge available to decision makers in both the public and private sectors; strengthening and refining of findings through data synthesis; reducing duplicative research; and enhancing the effectiveness of interdisciplinary research efforts. More coordinated research efforts driven by state of Alaska priorities would have significant impact for policy makers and decision makers, allowing them to address opportunities and challenges in the emerging Arctic.

RECOMMENDATION 4A

Ensure state funding to, and partnership with, the University of Alaska for Arctic research that aligns with state priorities and leverages the University's exceptional facilities and academic capacity.

Lead: Statewide Committee for Research

Justification

Of primary importance is the ability of the state of Alaska to articulate clear research goals that are consistent with the state's interests. A stronger partnership between user groups and the science and research community will yield greater understanding and translatable results for users and more consistent funding for researchers. The variability of annual funding is a challenge for the University system and leads to erratically or at least irregularly funded research being conducted. Increased alignment between state priorities and University research capacity should not be seen as impacting the independence of the University or its research. Joint objectives will increase the usability of the research findings and the efficacy of or return on investment. The state of Alaska has the opportunity to define its leadership role in the Arctic. The capacity of the University system is directly related to the state's ability to project competency and competitive advantage in a crowded field. While the state will count on "best science" from any research, it is in the state's interest to build capacity within Alaska and within Alaskan institutions to produce this.

Resources Needed

Fiscal – Funding commensurate with desired outcome; increased funding for specific research projects or studies or agency staff for project management of investments.

Leveraged – Federal efforts through NSF, USARC, IARPC, Polar Research Board and the NPRB would be valuable and partnership might result in increased inclusion of state expertise.

Partners – State – DEC, DNR, SCoR, DF&G, local governments; Federal – IARPC, USARC, NOAA, DOI, NSF, DHS, DHHS, NPRB, NSSI; Other – private sector R&D, environmental nongovernmental organizations, AOOS, University of the Arctic, University of Alaska and branch campuses, regional nonprofits.

Execution

The Governor's office will have to take a direct role in prioritizing efforts and identifying acceptable funding levels. At the same time, state agencies should consider additional roles related to assessment and monitoring activities and identifying new efforts that are complementary to ongoing research. The Statewide Committee for Research (SCoR) should consider an arm directly related to Arctic science and research. The success of this recommendation depends on a strong partnership between the University of Alaska and state agencies both in science collaboration and coordination, and the necessary co-investment to support these efforts.

Legislative Actions

1. Consider revising the makeup and scope of the Alaska Statewide Committee for Research.
2. Invite testimony from federal agencies - IARPC, NSF, USARC, NOAA and DOI - on research priorities.
3. Convene committee hearings related to applied research opportunities and related opportunities for business development.
4. Fund the SCoR to lead the assessment of current state efforts and develop a report identifying state priorities and to make recommendations to the Governor on budgets necessary to realize those priorities for science and research.
5. Invest in existing UA facilities including research stations such as Toolik Lake Research Station and the ACEP that have that the capacity to support local, national and international science needs.
6. Work with Governor to ensure that the Administration has capacity to identify science/research portfolios and portfolio holder(s), engage with SCoR and broader efforts to establish science and research priorities and agencies, and allocate appropriate budgets to meet these needs.

Evaluation

Success will be measured by evaluating: 1) development of a state research agenda; 2) the extent to which collaboration is taking place; 3) incorporation of University research in future decision-making by state agencies or policy makers; 4) confidence amongst lawmakers that funding is achieving outcomes.

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RECOMMENDATION 48

Increase collaboration and strengthen capacity for coordination within the Arctic science and research community.

Lead: Department of Natural Resources

Justification

Coordination and prioritization of research activities must be improved. Federal interagency efforts in this sphere are already substantial and a number of them include state agency participation. The federal government has called for a review of interagency activities in the Arctic in order to identify and address overlapping missions and reduce duplication of effort, which should include evaluation of state and local engagement. The state of Alaska has an increasingly important role to play in the review and in the crafting of recommendations and in considering the current limited capacity to address Arctic science and research demands. Alaska should pursue strategies to broaden and strengthen the influence of its agencies, its academic experts and its local governments and associations. Of significant concern to Alaska is the quality of Alaskan participation in scientific research and federal decision-making, as well as the geographic scope of that coordination through NSSI. The mission of the NSSI is to improve scientific and regulatory understanding of terrestrial, aquatic and marine ecosystems on the North Slope of Alaska. This intergovernmental organization has provided an open forum for discussing resource development activities, climate change, monitoring needs, best practices and other research and inventory issues but is limited to the North Slope and could be expanded for a more comprehensive understanding of the Alaskan Arctic.

Resources Needed

Fiscal – This will depend on scale of support or expansion of the program, but at the minimum require an increase in staff time and travel budgets.

Leveraged – Federal agencies committed to a more integrated management of the Arctic and who have identified the state of Alaska and Alaska Natives as partners in stewardship of that region, and for whom federal resources should be expended.

Partners – State – DF&G, DEC; Federal – NSSI, DOI, NOAA; Other – Alaska Native organizations and co-management groups; University of Alaska and its branch campuses; local governments

Execution

The state of Alaska should not only continue active participation in the NSSI but also: a) explore expanding the scope of participation and work for the group; b) consider creating a similarly-structured entity for the Northwest Arctic and Bering Straits region, as well as one for the Aleutians and Western Alaska; or c) consider the creation of a similarly-structured organization whose scope would include the whole of Alaska's Arctic region. Ideally, there would be three geographic groups represented, (North Slope including Chukchi and Beaufort Seas, Bering Sea/Aleutians, and Gulf of Alaska), that also have an overarching coordinating committee.

Legislative Actions

1. Identify common research goals and outcomes by Alaska sub regions that can inform the development of a state research agenda.
2. Increase efforts to incorporate local and municipal level perspectives in state-federal planning bodies.
3. Urge the amendment of Section 348 of the Energy Policy Act of 2005 to require that at least two members on the NSSI's Science Technical Advisory Panel (STAP) be Alaskans from state agencies, at least three members be Alaskans from the state university system and at least two members be Alaskans from local government entities.
4. Consider convening a pan-Arctic organizing council to look across regional priorities, identify the narrow subset of topics that the state and federal agencies can jointly address, and determine topics that would benefit from international cooperation.

Evaluation

Success will be measured by evaluating: 1) an increase in engagement opportunities for local, state and federal agency land and resource managers, leading to 2) the development of greater cooperation and partnership that 3) results in streamlining of regulatory processes for more efficiency.

RECOMMENDATION 4C

Strengthen efforts to incorporate local and traditional knowledge into science and research and use this community-based knowledge to inform management, health, safety, response and environmental decisions.

Lead: Department of Environmental Conservation

Justification

In 2012 the ANWTF noted that "the local and traditional knowledge gathered by Alaska's indigenous peoples over thousands of years is critically important to a fuller understanding of our northern ecosystems and the multitude of marine and land-based resources within them." The ANWTF went on to recommend that "the local and traditional knowledge of the state's indigenous inhabitants be incorporated into all relevant areas of study" in the Arctic. Alaska laws do require public notice and comment periods related to agency decisions on permits, authorizations and area management plans, but many representatives from local governments and Alaska Native organizations have voiced discontent with the lack of specific reference to traditional knowledge and tribal consultation in that body of law. While the goal of using traditional knowledge in conjunction with conventional research is of considerable importance, there also exists a pressing need for increased investigation into precisely how to effectively and meaningfully do so. In Traditional Knowledge and the Arctic Environment, published by the Pew Charitable Trusts U.S. Arctic Program in August 2013, the authors assert that it is time to assess the use of traditional knowledge to date and ask, "What can be done to make better use of what traditional knowledge has to offer while respecting the time, patience, and expertise of its holders?" This question, and the extent to which state agencies and the university have embraced the incorporation of traditional knowledge, remains challenging.

Resources Needed

Fiscal – Formalization of the practice of engaging local and traditional knowledge holders beyond the current public comment processes would require greater staff and travel budgets for state agencies.

Leveraged – Existing interagency efforts provide good opportunities for addressing this topic without a significant increase in funding by the state.

Partners – State – DFG, DNR, local government, HSS; Federal – DOI, DOS, NPRB, NSSI; Other – University of Alaska, UArctic, Arctic Council, co-management groups, Alaska Eskimo Whaling Commission.

Execution

The Administration and Legislature should give this recommendation due consideration in order to facilitate implementation. The state does have public processes that draw on and invite local and traditional knowledge, but discontent from Alaska's Arctic communities indicates that the state must strengthen this effort. The Governor should direct state agencies to be proactive in identifying a solution that meets public demand while maintaining effective stakeholder engagement practices in making resource management decisions. The Governor can build off the Community Based Monitoring workshop held in April 2014 that identified best practices and lessons learned from activities that include local and traditional knowledge. A manual of these is currently in development through a grant from NSF and will be released at the 2015 Alaska Forum on the Environment.

Legislative Actions

1. Establish a working group, with members of local government, state agencies and the university to identify and assess current state practices, producing a report and lists of recommendations and best practices.
2. Invite testimony of local and traditional knowledge holders to committee hearings.
3. Work with regional and community tribal authorities to identify traditional knowledge experts who have expertise in matters pertaining to ice movement, ocean currents and weather patters as a means of creating a rapid-response knowledge network that could be utilized in the event of an oil spill or other disaster.

Evaluation

Success will be measured by: 1) an increase in public confidence in management decisions, and their responsiveness to local and traditional knowledge; 2) an increase in traditional knowledge represented in and co-producing scientific research; 3) the development of standards of use; and 4) an increase in conflict avoidance.

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RECOMMENDATION 40

Improve, support, and invest in data collaboration, integration, management and long-term storage and archiving.

Lead: Statewide Committee for Research

Justification

Collaborative efforts to integrate existing and new data from various sources and support long-term management of databases will help reduce uncertainly, optimize resources, and realize gains in competitive advantage in the Alaskan Arctic. With increased human activity in the Alaskan Arctic, acquiring, mapping and making accessible accurate data – geospatial, monitoring, observational, baseline, mapping, and charting – will be important for decision making and modeling of future scenarios. Once data is available, integrated, and well-documented there is potential for decision making to be more optimized and efficient. Data-sharing between the public and private sector, academia, across regions, and in the circumpolar north could improve safety and enhance economic development, as well as environmental protection. Groups such as the Alaska Climate Change Subcommittee, AOOS, NSSI and others have raised data management issues repeatedly. Addressing data challenges is a pressing need that with some planning and small investment now will support responsive, well-informed decisions for a competitive and growing Alaskan economy.

Resources Needed

Fiscal – The state of Alaska, via the Alaska State Geospatial Council, should anticipate increased leadership as a facilitator of multi-agency cooperation; current funding is adequate for planning purposes but increased funding would be needed for implementation

Leveraged – The University of Alaska and AOOS have already been working to manage researcher data, therefore the state of Alaska can build upon these and other capacities.

Partners – State – all agencies; Federal – NSF, USARC, NSSI; Other – University of Alaska; AOOS; local government; Alaska Native organizations; industry groups.

Execution

The Alaska State Geospatial Council is currently working on the challenge of data storage related to increased mapping and charting efforts in the state. The Alaska Data Integration Working Group is looking at the broad challenges associated with integrating and sharing data. AOOS has developed a new cloud-based data sharing system called the Research Workspace to promote scientific data sharing and integration. The system provides secure access to data to project teams for internal synthesis and data sharing, with protocols for publishing data to the AOOS Ocean Data Explorer. The Alaska Geospatial Council is working towards digitizing airborne and satellite imagery, digital elevation model data, landsat, topographic maps and navigational charts. Federal responsibilities include data access and management and this is a good area for partnership, including with the Arctic Research Mapping Application (ARMAP); Arctic Environmental Response Management Application (ERMA); the Exchange for Local Observations and Knowledge of the Arctic (ELOKA); National Snow and Ice Data Center (NSIDC); and the Advanced Cooperative Arctic Data and Information Service (ACADIS).

Legislative Actions

1. Encourage federal agencies to work with state of Alaska agencies to identify data storage, integration, and management solutions.
2. Encourage state co-investment in implementing these solutions, including funding of data centers and online storage systems.
3. Increase state research funding, or consider matching private sector or NSF funding for Alaska Arctic science and research.
4. Require that all projects completed under state of Alaska funding to archive data someplace with appropriate metadata (i.e. descriptors such as how it was collected, units etc) that is then created and edited to ISO 19115 standard and receive a Digital Object Identifier (DOI) registration number for identification, retrieval, exchange and maintenance of intellectual property.

Evaluation

Success will be measured by the 1) increased amount of accessible data and 2) increased actual use of this data.

RECOMMENDATION 4E

Support monitoring, baseline, and observational data collection to enhance understanding of Arctic ecosystems and regional climate changes.

Lead: Statewide Committee for Research

Justification

To better anticipate and adapt to changes across the Arctic region, Alaska needs to continue to advance basic research. In summarizing its chief recommendations, the Alaska Climate Change Sub-Cabinet noted: "The success and accuracy of downscaled models is largely dependent upon the quantity and quality of data available." The compiling of comprehensive baseline knowledge of existing environmental conditions is also crucial to measure, in order to subsequently mitigate the impacts of increased activity in Arctic ecosystems. Focuses should not only include marine and terrestrial physical, chemical and biological variables but also cultural practices, social sciences, economics and health of Arctic populations. Some federal agencies are mandated to provide baseline information and the state does not have a desire to take on federal responsibilities without due compensation, however this is a good opportunity to partner for mutual benefit.

Resources Needed

Fiscal – Funding commensurate with desired outcome; increased funding for specific research projects or studies or agency staff for project management of investments.

Leveraged – NSSI, ANTHC, and AOOS as well as federal efforts through NSF, DOI and NASA would provide a valuable starting point to bring data together in an integrated way that would support real-time decision making.

Partners – State – Governor's Office, DEC, DNR, DF&G, local governments; Federal – IARPC, USARC, NOAA, DOI, NSF, DHS, DHHS, NPRB, NSSI, USACE; Other – private sector R&D, AOOS, environmental nongovernmental organizations, University of the Arctic, University of Alaska and branch campuses; ANTHC.

Execution

Benchmark data, (reference points measured over time), provide the most reliable monitoring of ecosystems in an active and changing Arctic. The Local Environmental Observation Program, managed by ANTHC, is a successful network of citizen scientists that report unusual plants and wildlife, extreme weather, flooding, drought and wildfires to a central database. Other monitoring initiatives could focus on the following: 1) high frequency radars that monitor ocean currents in the Chukchi and Beaufort Seas to be used for oil spill trajectories and ecosystem modeling; 2) ocean acidification monitoring using buoys and ship transects; 3) underwater glider observations to detect marine mammals and measure other subsurface ocean conditions; 4) year-round ocean measurements of physical, chemical, geological and biological parameters to track seasonal, annual and long-term changes; 5) wave measurements to improve storm surge and coastal erosion mapping and planning; 6) adding marine weather and sea ice forecasts to vessels using AIS tracking; and 7) ice property and movement data from drifting sensors and coastal radar to identify hazards and improve forecasting.

Legislative Actions

1. Request that the Governor's office convene a working group to evaluate priorities related to baseline monitoring and observations, perhaps through the Statewide Committee for Research, and make recommendations to the executive and legislative branches regarding resources needed to meet high priority items.
2. Support baseline data planning at five year intervals to ensure that data collected is responsive to identified priorities and user needs.

Evaluation

Success will be measured by: 1) the establishment of an integrated network for baseline and monitoring; and 2) increased availability and use of baseline data for forecasting.

99

RECOMMENDATION 4F

Invest in U.S. Arctic weather, water and ice forecasting systems.

Lead: Department of Environmental Conservation

Justification

Alaska has a long history of navigating in and on ice-covered waters. Hunters and whalers are active in the Arctic region and have extensive experience accomplishing subsistence activities. In recent years, the northern ice has become less predictable and incidents endangering local activities have increased. Safe marine and air operations rely on knowing the ocean's behavior -- ocean circulation, currents and storm surges -- and having general domain awareness coupled with adequate response capacity. An understanding of ocean parameters is also critical in oil spill response as the type of tools employed for any response will be determined by how oil behaves in, on, and under the ice. Robust, sustainable and effective acquisition of relevant observational ocean data that can serve as tools to forecasting systems should be a high priority to ensure safety in the Arctic region. NOAA/NWS are mandated to provide the service of a forecasting system. Working with NOAA and other partners, the state can position itself to provide the most accurate and timely information about ice in U.S. Arctic navigable waters, thereby promoting safe and efficient maritime operations and to help protect Alaska's environment.

Resources Needed

Fiscal -- Funding commensurate with desired outcome; increased funding for specific research projects or studies or agency staff for project management of investments.

Leveraged -- Federal agencies, (NOAA, USN), maintain operational analysis and forecasting systems and many other federal and academic partners, such as AOOS, invest in supportive observing systems and science research activities. State partnership could help fill gaps.

Partners -- State -- DMVA, DNR, DF&G, local governments; Federal -- IARPC, USARC, NOAA (NWS, NESDIS, NOS, OAR), DOI, NSF, DHS, NPRB, NSSI, NSIDC, DOD (USN); Other -- private sector R&D, AOOS, environmental nongovernmental organizations, University of Alaska and branch campuses.

Execution

There are a number of ocean observing programs ongoing in Alaska: Alaska Corps of Coastal Observers for weather and shore-line process; Sea Ice for Walrus Outlook for weekly reports of sea ice conditions; the Local Environmental Observer Network, (sea and land observations); and the Bering Sea Sub-Network for local environment and subsistence harvest data. As community-based monitoring programs, these organizations provide valuable resources to track information from people active in the Arctic. This important information needs to be considered along with the quantitative data from wave buoys, ice mass balance buoys, flux buoys, sea and wave gliders and other equipment. Co-production of knowledge from local observations, mechanical systems observing ocean and ice conditions and forecast modeling would enhance understanding of: variations in sea ice coverage and thickness; patterns of ice movement, ice type, sea state, ocean stratification and circulation, storm surges and improved resolution and response in areas of potential risk. Beyond the U.S., the state can draw on expertise from the Canadian Ice Service and the Finnish Meteorological Institute among others in the Arctic. The lead agency should look at the number of efforts underway that may not necessarily be sustainable on their own. It would be important to build on existing momentum and develop a plan for near-term action on how to maximize information from existing efforts since that information can help refine and focus future operational efforts.

Legislative Actions

1. Invite testimony from the ocean observing, monitoring and modeling programs in Alaska and nationally.
2. Convene a workshop that explores best practices in the circumpolar north, drawing on experience from all eight Arctic nations and cold-weather regions. Outcomes should develop into an inventory of current efforts, evaluation of the sustainability of each effort and application of traditional knowledge and cultural use.
3. Consider co-investment with NOAA on appropriate technologies and practices.

Evaluation

Success will be measured by: 1) increased coverage and ocean and ice measurements in the Arctic region; and 2) increased use of this data for forecasting and response capabilities.

100

RECOMMENDATION 46

Update hydrocarbon and mineral resource estimates and mapping in the Alaskan Arctic.

Lead: Department of Natural Resources - Division of Geological and Geophysical Surveys

Justification

DNR's Division of Geological and Geophysical Surveys, (DGGS), has the statutory authority to "conduct geological and geophysical surveys to determine the potential of Alaskan land for production of metals, minerals, fuels, and geothermal resources..." (Alaska Statutes Sec. 41.08.020). The USGS estimates that the circumpolar Arctic region could hold about 13% of the world's undiscovered oil reserves. While this certainly can make the Alaska attractive for investment, other formidable challenges such as distance and geography could be alleviated, in part, through greater certainty from mapping.

Resources Needed

Fiscal – Legislative grant to DNR for agency staff to review current work and develop plan to address most pressing needs and high potential locations. As the Alaska Geospatial Council has been established, this coordinating body should be funded adequately to collect elevation data for the entire state.

Leveraged – GINA can be used as the existing mechanism for sharing and Arctic ERMA may use topographic data to help facilitate coordinated emergency responses across the state. Existing interagency mechanisms are established and should be used efficiently. Federal agencies have much to gain from any mapping data and should contribute funds accordingly.

Partners – State – DNR Division of Mining, Land, and Water, AIDEA; Federal – DOI, NOAA; Other – private sector companies; Alaska Native tribes, corporations, organizations; Alaska Miners Association; University of Alaska and its branch campuses; GINA.

Execution

DNR has a well-established history of mineral and natural resource mapping and the recently-formed Alaska Geospatial Council is expected to consider the Arctic a high priority. The Airborne Geophysical/Geological Mineral Inventory is an example that has already identified 40 million acres of state land with high potential for mineral deposits. However, the state has only mapped about an eighth of those 40 million acres, (as of February 2013). Hyperspectral technologies that identify specific minerals could be used more and add value to mapping information. The private sector has some of this data and collaborative work could focus on ways to make that information available. As the lead agency, DNR will be responsible for identifying current efforts and organizing a plan to coordinate various efforts by other entities with an eye toward prioritizing high potential areas, as well as initial assessments for unmapped areas.

Legislative Actions

1. Request that DNR assess previous work and current mapping efforts and strategically plan for immediate needs and long-term investments.
2. Fund, as needed, the work necessary to complete the assessment and planning.
3. Evaluate the effectiveness of current strategy for mapping and explore collaborative investment to meet goal of updating hydrocarbon and mineral resource mapping and to refresh existing, (but often incomplete), imagery.
4. Review and revise, as necessary, the process for long-term data storage, management and promoting the shared use of data.
5. Increase as needed the funding to DNR to work with federal partners to complete mapping the state.

Evaluation

Success will be evaluated by: 1) the percentage of Alaska mapped for hydrocarbon and mineral resources estimates; and 2) the extent to which this data is openly accessible to, and used by, the public.

6 Conclusion

Alaska's future will be determined by a commitment to a framework of governance driven by leadership, collaboration and transparent and inclusive decision making that achieves outcomes that benefits Arctic peoples and all Alaskans. Furthermore, Alaska's Arctic must be both economically and environmentally vibrant, achieved through resource development and respect for the environment upon which Alaskans depend. Governance – the exercise of decision-making authority – will respect the need for a robust economy, vibrant communities and healthy environment, and Alaskans' diverse cultures, practices and traditional values.

These principles are reflected in Alaska's Constitution, specifically the development, management and conservation of all natural resources for the maximum benefit of Alaskans, (constrained by the sustained yield management principle). The state Constitution protects the inherent personal rights of all people, and provides for varying levels of government and jurisdiction, as well as for maximum local self-government.

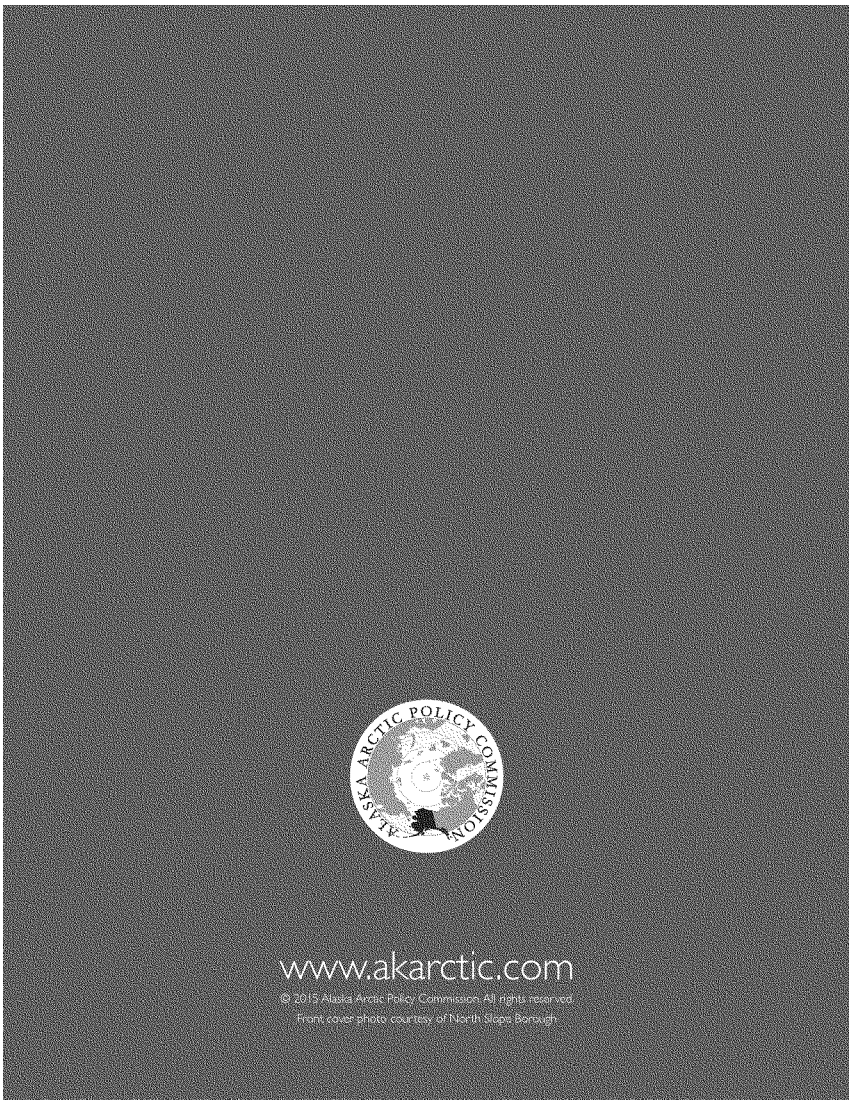
The four strategic lines of effort that the Commission recommends the State pursue, should be achieved through five main objectives of governance that support broad inclusive participation, transparent planning processes, and a cross-sectoral, integrated approach. The Commission stresses the importance of: 1) local government; 2) use and consideration of traditional knowledge; 3) the role of integrated approaches; 4) incorporate the value of meaningful inclusion of Alaskans in these approaches; and 5) improve information access to support an informed decision-making process. Guidelines for how issues are addressed in the Arctic will help foster standards of practice that can be applied to future challenges in an ever changing region.

With these strategic lines of effort in mind, the Commission has taken a long-term perspective, (that includes both the present and the future), and meets challenges through integrated solutions, (avoiding fragmented approaches). The Commission's work mobilizes the state's human, natural and financial resources to address current needs while recognizing that adequate resources should be available for future generations, and understanding that these might come in new and different forms as technology and demands shift over time. The Alaska Arctic Policy and Implementation Plan, then, seeks a better quality of life for the whole Arctic region without compromising the well-being of other communities or the state as a whole; healthy marine and terrestrial ecosystems; effective governance supported by meaningful and broad-based citizen participation; and economic security.

7 List of Acronyms

AAC	Arctic Athabaskan Council
AAPC	Alaska Arctic Policy Commission
ACADIS	Advanced Cooperative Arctic Data and Information Service
ACCIMP	Alaska Climate Change Impact Mitigation Program, Alaska DCCED-DCRA
ACEP	Alaska Center for Energy and Power
AEA	Alaska Energy Authority
AFN	Alaska Federation of Natives
AGC	Alaska Geospatial Council
AHFC	Alaska Housing Finance Corporation
AIA	Aleut International Association
AIDEA	Alaska Industrial Development and Export Authority
AIS	Automatic Identification System
AMATII	Alaska Marine and Aviation Transportation Infrastructure Initiative
AML	Alaska Municipal League
ANC	Alaska Native Corporation
ANILCA	Alaska National Interest Lands Conservation Act
ANTHC	Alaska Native Tribal Health Consortium
ANSEP	Alaska Native Science and Engineering Program
ANWR	Arctic National Wildlife Reserve
ANWTF	Alaska Northern Waters Task Force
AOOS	Alaska Ocean Observing System
APFC	Alaska Permanent Fund Corporation
APICC	Alaska Process Industry Careers Consortium
ARDOR	Alaska Regional Development Organization
ARMAP	Arctic Research Mapping Application
ARUC	Alaska Rural Utility Collaborative
ASMI	Alaska Seafood Marketing Institute
ATC	Alaska Technical Center in Kotzebue
AVTEC	Alaska Vocational Technical Center
AWIB	Alaska Workforce Investment Board
BLM	Bureau of Land Management, United States DOI
BOEM	Bureau of Ocean Energy Management, United States DOI
CACFA	Citizen's Advisory Commission on Federal Areas
CAFF	Conservation of Arctic Flora and Fauna Working Group, Arctic Council
CANNOR	Canadian Northern Economic Development Agency
CCHP	Climate and Cryosphere Hazards Program, Alaska DNR-DGGS
CCHRC	Cold Climate Housing Research Center
CDC	Center for Disease Control, United States HHS
CDQ	Community Development Quota
CED	Center for Economic Development, University of Alaska
CEDS	Comprehensive Economic Development Strategies
CEQ	Council on Environmental Quality, United States Executive Office of the President
CMTS	U.S. Committee on the Marine Transportation System
CTE	Career and Technical Education, Alaska DEED
DCCED	Alaska Department of Commerce, Community, and Economic Development
DCCED-DCRA	Division of Community and Regional Affairs
DEC	Alaska Department of Environmental Conservation
DED	Division of Economic Development, Alaska DCCED
DEED	Alaska Department of Education and Early Development
DF&G	Alaska Department of Fish and Game
DGGS	Division of Geological and Geophysical Surveys, Alaska DNR
DHHS	United States Department of Health and Human Services
DHSS	Alaska Department of Health and Social Services
DMVA	Alaska Department of Military and Veterans Affairs
DNR	Alaska Department of Natural Resources
DNR-OPMP	DNR Office of Project Management and Permitting
DOC	United States Department of Commerce
DOD	United States Department of Defense
DOE	United States Department of Energy

DOI	United States Department of the Interior
DOL	Alaska Department of Law
DOLWD	Alaska Department of Labor and Workforce Development
DOR	Alaska Department of Revenue
DOS	United States Department of State
DOT&PF	Alaska Department of Transportations and Public Facilities
EDA	United States Economic Development Administration
EETF	Emerging Energy Technology Fund
ELOKA	Exchange for Local Observations and Knowledge of the Arctic
EPA	United States Environmental Protection Agency
ERMA	Environmental Response Management Application
ESA	Endangered Species Act
FEMA	United States Federal Emergency Management Agency
GCI	Gwich'in Council International
GINA	Geographic Information Network of Alaska
HUD	United States Department of Housing and Urban Development
IARPC	United States Interagency Arctic Research Policy Committee
IASC	International Arctic Science Committee
IAWG	Immediate Action Working Group
ICC	Inuit Circumpolar Council
IHS	United States Indian Health Service
IMO	International Maritime Organization
IRS	United States Internal Revenue Service
LUMP	Local Utilities Management Program
MARAD	United States Maritime Administration
MXAK	Marine Exchange of Alaska
NASA	National Aeronautics and Space Administration
NIH	United States National Institutes of Health
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPR-A	Nation Petroleum Reserve-Alaska
NPFMC	North Pacific Fishery Management Council
NPRB	North Pacific Research Board
NREL	National Renewable Energy Laboratory
NSF	National Science Foundation
NSIDC	National Snow and Ice Data Center
NSSI	North Slope Science Initiative
NWS	National Weather Service
OCS	Outer Continental Shelf
OIT	Alaska Office of International Trade
OMB	United States Office of Management and Budget
OSRO	Oil Spill Response Organization
OSTP	Office of Science and Technology Policy, United States Executive Office of the President
PNWER	Pacific Northwest Economic Region
REAP	Renewable Energy Alaska Project
RRT	Regional Response Team
RurAL CAP	Rural Alaska Community Action Program
SAR	Search and Rescue
SCoR	Alaska Statewide Committee for Research
SPAR	Spill Prevention and Response, Alaska DEC
STAP	Science Technical Advisory Panel
UAA	University of Alaska Anchorage
UAF	University of Alaska Fairbanks
USACE	United States Army Corps of Engineers
USARC	United States Arctic Research Commission
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USDOL	United States Department of Law
USF&WS	United States Fish and Wildlife Service
USGS	United States Geological Survey, United States DOI
USN	United States Navy
USNORTHCOM	United States Northern Command



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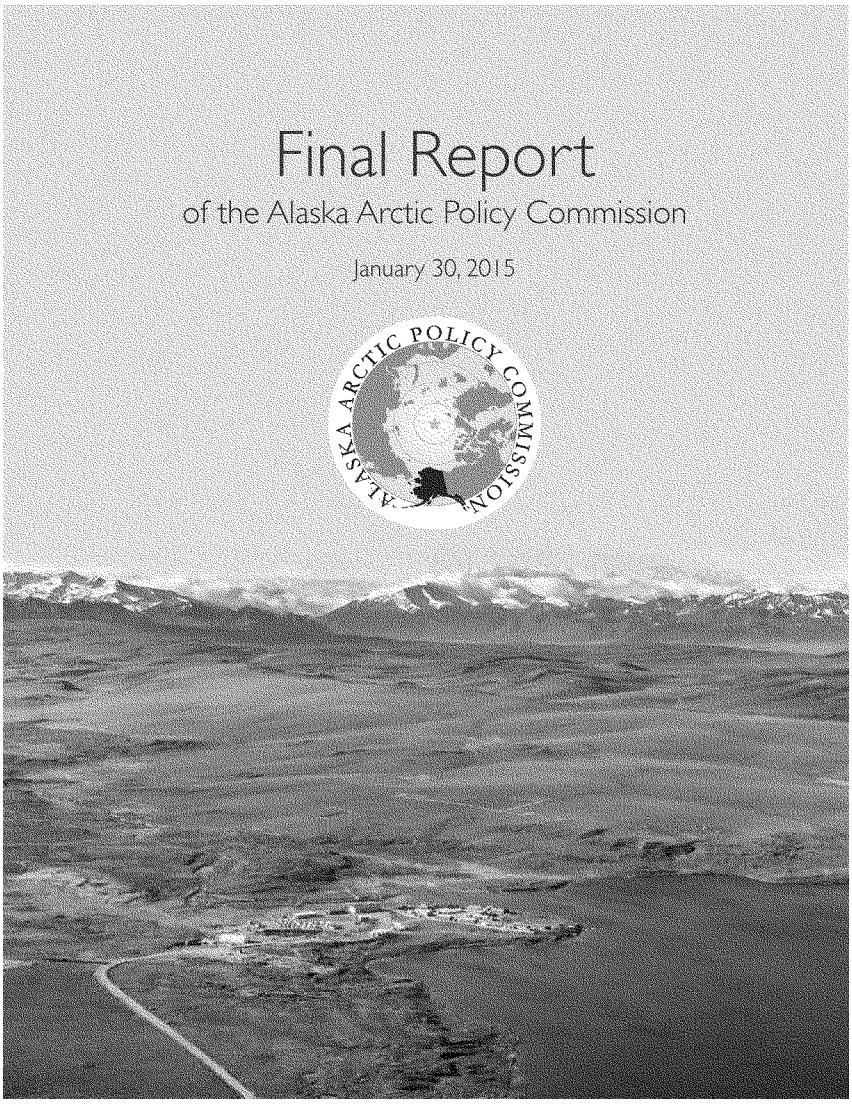

Final Report
of the Alaska Arctic Policy Commission
January 30, 2015
ALASKA ARCTIC POLICY COMMISSION

Alaska Arctic Policy Commission

Co-Chair: Senator Lesil McGuire, Anchorage, 907.465.2995
Co-Chair: Representative Bob Herron, Bethel, 907.465.4942

January 30, 2015

Dear Alaskans,

Alaska is America's Arctic, and the Arctic is a dynamic region that is changing rapidly. We cannot let the perceptions of others – who might not understand its value or its people – determine Alaska's future. Alaska's future in the Arctic demands leadership by Alaskans.

Since the 1867 purchase of Alaska from Russia, the United States has been an Arctic nation. Unique challenges of sea ice and permafrost, the remoteness of communities, and distance from markets, but also exceptional opportunities, have always made it obvious to those living here that Alaska is "Arctic."

Alaskans are building on a history of vision, hard work and experience living in, developing and protecting our home, and now find ourselves at the forefront of emerging Arctic economies and resource development opportunities that have the potential to promote and create healthy resilient communities. Urgent action is required.

The Arctic presents us with unparalleled opportunities to meet the needs of Alaskans and the nation. As Alaskans we have a shared responsibility to understand the issues at stake, including the perspectives and priorities of Arctic residents, and to set a clear course for leadership now and into the future. The United States is just now beginning to realize it is an Arctic nation – and that it should assume the responsibilities that come with that reality, while assessing the potential. While the state may not always agree with the federal government, the actions of federal agencies clearly affect the interests of Alaskans. We want to chart our own destiny with a large say in how that destiny will unfold.

In 1955 Bob Bartlett addressed the delegates at the Alaska Constitutional Convention, stressing the importance of resource development to the "financial welfare of the future state and the well being of its present and unborn citizens..." He continued on to describe two very real dangers – exploitation without benefit and efforts to constrain development. These concerns are still very relevant today: "Two very real dangers are present. The first, and most obvious, danger is that of exploitation under the thin disguise of development. The taking of Alaska's mineral resources without leaving some reasonable return for the support of Alaska governmental services and the use of all the people of Alaska will mean a betrayal in the administration of the people's wealth. The second danger is that outside interests, determined to stifle any development in Alaska which might compete with their activities elsewhere, will attempt to acquire great areas of Alaska's public lands in order NOT to develop them until such time as, in their omnipotence and the pursuance of their own interests, they see fit."

Bob Bartlett's wisdom holds true today, as we see from actions of the federal government the potential for both dangers to occur. With this in mind, we expect from our federal government outer-continental

shelf revenue sharing; we want access to federal lands and more powers devolved from the federal government; we value our federally-protected wilderness and marine areas, but Alaskans should decide for ourselves whether we want any more; and we are concerned with climate change and want to partner with the federal government to adapt, rather than endure any federal attempts to solve world climate change on the backs of Alaskans.

Alaskans understand that our climate is changing; we are watching it happen, here, in our home. We are watching our permafrost melt, our shores erode and are on the verge of having some of the world's first climate change refugees. However, Alaskans will adapt to change when having the freedom to make our own economic decisions.

We are concerned that Alaskans will not be able to develop our economy in a way that will allow us to respond to, and prosper, in the face of change. All levels of government can work together to empower Alaskans to adapt and promote resilient communities. We believe that people should come first.

Economic development for the benefit of Arctic residents will continue to be a focus for the state of Alaska and we will continue to advocate for this to be one of the priorities during the United States chairmanship of the Arctic Council. Economic development in the Arctic is economic development across the state: we all stand to gain by action.

A people-first approach recognizes that Alaska lacks some of the basic infrastructure needed for emergency and environmental response capacity, search and rescue, telecommunications, ports, roads and railways. We must address these as priorities, or they will remain barriers that hinder the next steps toward creating vibrant economies that support our Arctic and Alaskan communities. Resource development, shipping and tourism will happen across the North, with or without Alaska. The lack of infrastructure and the speed at which global development in the Arctic is occurring should be a call to action – to build and to create. To sit idly by only increases our risk while preventing us from capitalizing on the new opportunities. We need a new way forward – this is the Arctic imperative that the nation can respond to.

The timeliness of this report is consistent with the interest and commitment that our neighbors in the circumpolar north have shown in developing Arctic policies. In addition, it coincides with the warranted but past due attention that the United States has given the topic in the last twelve months. While U.S. action and interest in the region is important, Alaska needs to develop and pursue its own Arctic vision, consistent with our understanding of, and claim to, the Arctic.

This report does just that, setting forth a vision for Alaska's Arctic future. This vision consists of healthy resilient communities across the state built from economic and resource development, leadership, courage and hard work. The Alaska Arctic Policy and Implementation Plan presented here creates a framework of policy and recommended actions that can be built upon and adapted to the emerging reality of the Arctic as a place of opportunity, stewardship and progress. We propose that Alaska act strategically, directing its focus on the Arctic for the benefit of Arctic residents, all Alaskans, and the nation.

Sincerely,

Senator Lesil McGuire

Representative Bob Herron

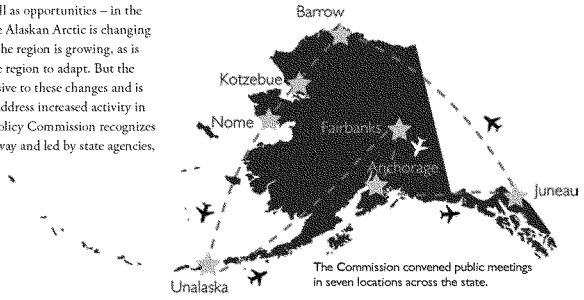
Introduction

The Alaska Arctic Policy Commission presents a vision of economic advancement, resilient communities, a healthy environment and thriving cultures. The Commission believes this vision can be achieved through strong Alaska leadership, utilization of expert knowledge within the state and through an increase of collaborative partnerships between a variety of entities, including the federal government.

The changing climate and globalization are heavy drivers of this new paradigm, even as the world's attention shifts to this emerging frontier. The geographic and regional response differences are less clear. In conjunction with heightened accessibility, climate change presents obstacles of unpredictability, variability and the associated heightened risks. Similarly, the effects of globalization are not uniform across the Arctic region. The North American Arctic is vastly different from the Scandinavian Arctic, for instance, in terms of economies of scale, response assets and infrastructure and governance systems. It is imperative that Alaskans adequately convey these challenges – as well as opportunities – in the spirit of Arctic cooperation. The Alaskan Arctic is changing and international attention on the region is growing, as is the list of needs required for the region to adapt. But the state of Alaska has been responsive to these changes and is well-positioned to continue to address increased activity in the region. The Alaska Arctic Policy Commission recognizes the many efforts already underway and led by state agencies, including:

- Resource and geospatial mapping
- Sub-area planning and emergency response
- Competitive fiscal regime
- Stable governance
- Workforce development and training
- Innovative technology development and application
- Sewer, water and sanitation upgrades
- Effective and inclusive permitting and regulatory system
- Science-based decision making
- Energy and power testing and research
- Northern port assessment
- Strong efforts for access to federal lands
- On and offshore development
- Transportation planning

The state is able to leverage these assets for great impact in the Arctic, where challenge and opportunity intersect, and offer its expertise to national and international efforts.



The Commission convened public meetings in seven locations across the state.

About the Alaska Arctic Policy Commission

In April 2012, the Alaska State Legislature established the Alaska Arctic Policy Commission to "develop an Arctic policy for the state and produce a strategy for the implementation of an Arctic policy." The Commission has conducted a baseline review of the Alaskan Arctic by evaluating strengths, deficiencies and opportunities in their Preliminary Report, submitted to the Alaska State Legislature in January 2014. Building on that foundation, the Commission has produced this Final Report that sets forth a proposed Arctic policy and implementation plan.

The state is an active and willing leader and partner in Arctic decision making, bringing expertise and resources to the table. Furthermore, the Commission has remained committed to producing a vision for Alaska's Arctic that reflects the values of Alaskans, provides a suite of options to capitalize on the opportunities and mitigate risk and that will remain relevant and effective in the future.

Alaska's Arctic policy will guide state initiatives and inform U.S. domestic and international Arctic policy in beneficial ways that ensure Alaska's people and environment are healthy and secure. The Commission has considered a broad diversity of Alaskan perspectives, drawing from an internal wealth of knowledge, while considering the national and international context of ongoing Arctic initiatives. This Final Report summarizes the Commission's findings and serves as the basis for both the Alaska Arctic Policy and the Implementation Plan.

The Alaska Arctic Policy Commission has, in this report to Alaskans, provided:

1. A review of economic, social, cultural and environmental factors of relevance to the Arctic and more broadly to all Alaskans.

2. A draft Alaska Arctic Policy, which drew on vision and policy statements developed through Commission consensus, that aims to reflect the values of Alaskans and provide guidance for future decision making.

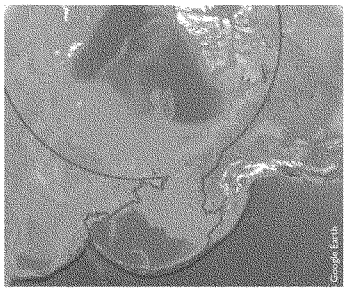
3. An Implementation Plan that presents four lines of effort and strategic recommendations that form a suite of potential independent actions for legislative consideration.

In its review of economic, social, cultural and environmental considerations it was important to the Commission to portray the breadth of the issues that were considered in relation to the Arctic. The following discussion and statements review this more fully and provide some context for the Commission's work on the resulting Arctic Policy and Implementation Plan.

For the purposes of its research the Commission applied the geographic definition of the U.S. Arctic set out in the Arctic Research and Policy Act (ARPA) – [A]ll United States… territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon and Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering and Chukchi Seas; and the Aleutian chain."[1] The Commission recommends that federal agencies use the complete ARPA 1984 definition and understand that in terms of international policy all of Alaska should be considered the U.S. Arctic.

[1] *Arctic Research and Policy Act of 1984. Pub. L. 98–373, title I, § 112, July 31, 1984, 98 Stat. 1248*

Arctic Boundary as defined by the Arctic Research and Policy Act (ARPA)



Review of Alaska's Arctic – A Foundation that Rests upon Economic and Resource Development

The state of Alaska has been engaged in Arctic development and protection since statehood, in 1959. Prior to statehood peoples of the region pioneered resource management, development and conservation for the benefit of the region. With statehood came the promise that Alaska's significant land and resource base would build its economy and support its citizenry.[2] Today, oil and gas development is a third of its economic activity and provides roughly 90% of Alaska's general fund revenue; minerals, timber, seafood and tourism contribute to the balance. Alaska has over 45 years of oil and gas development experience in the Arctic and over 100 years of mining experience.[3] The Trans Alaska Pipeline System (TAPS) is an example of a transformative infrastructure and resource development that required a solid vision and collaboration to complete in 1977. Still in operation today, TAPS has transported over 17 billion barrels of oil from the North Slope to the Valdez Marine Terminal where it is loaded on tankers headed south.

The Arctic will inevitably see expanding development as it is increasingly the focus of new commercial opportunities for resource exploration, development and production. While Alaska has long been the air crossroads of the world, changing Arctic maritime access could mean more efficient and expeditious delivery of extracted resources to markets across the globe. Arctic marine traffic is primarily driven by globalization of the region and consequently the ability to move cargo faster connecting Arctic natural resources with global markets. Alaska's maritime industry has prudently operated in these waters for nearly a century. A decrease in sea ice and increase in activity mandate continued and long-term investment in our maritime assets. Many organizations are actively engaged in this arena. These and other partners have an important role to play in maritime safety and security and in collaborating with the state and industries to establish best practices for safe development of the Arctic.

The vast mineral and hydrocarbon reserves make the Alaskan Arctic attractive for investment. However, development is challenged by distance to markets, limited infrastructure, costs and risks attendant to its remoteness, challenging weather and environmental conditions and a dwindling subfreezing season necessary for maintaining ice roads and conditions suitable for safe travel and operation within the Arctic.[4] Despite this challenging environment, exploration and development investment in the Arctic has steadily increased and will continue to do so if commodity prices remain high and Alaska remains competitive for investment dollars.[5] Alaska is in a global race to attract investment that will open new opportunities in the Arctic.

To encourage new capital investment and secure the benefits of new resource development upon which state and local communities depend, Alaska and its federal counterparts must continue to spearhead new strategies to keep Alaska competitive. The state has some of the most sophisticated interagency coordination and permitting processes in the country, with the expertise, experience and commitment to safely develop the Alaskan Arctic's vast resources. With this history and experience, Alaska is well-positioned to respond to increased resource development activity in the Arctic.

Some Alaskan Arctic communities are currently supporting new resource extraction projects. These communities recognize that oil, gas and mining industries offer meaningful employment, stable cash economies and reliable municipal revenues that support clean water, sanitation, health clinics, airports and other infrastructure necessary for strong, safe and healthy communities. While circumstances differ among local governments, resource development projects often generate an influx of new revenue sources. This new revenue has, in many cases, afforded local governments the resources to expand emergency response and search and rescue capabilities, take an active role in oil spill preparedness and implement meaningful measures to protect regional ecosystems and local food sources that are critical to a subsistence culture. Resource development also holds the potential to increase access to affordable energy in remote communities with staggering energy costs.

It is imperative to balance new resource development opportunities – both on- and offshore – with safeguards that consider possible environmental impacts. Although debate of potential risks to the environment and impact on subsistence

2 Alaska State Constitution sections: 8.1 and 8.2

3 Banet, Jr., Arthur C., Oil and Gas Development on Alaska's North Slope: Past results and future prospect, USDOI – BLM – Alaska, Open File Report 34, March 1991; See Table 1, www.blm.gov/pgdata/etc/medialib/blm/ak/aktest/ofr.Par.49987.File.dat/OFR_34.pdf (Accessed May 2013)

4 USGCRP. 2009. Regional climate impacts: Alaska. in T.R. Karl, J.M. Melillo, and T.C. Peterson (Editors), Global climate change impacts in the United States: A state of knowledge report from the U.S. Global Change Research Program. Cambridge University Press, New York, N.Y., p. 139-144, http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-reports.pdf (Accesed May 2013).

5 Haley, S., M. Klick, N. Szymoniak, and A. Crow. 2011. Observing trends and assessing data for Arctic mining. Polar Geography 34:1-2, 37-61.

resources is contentious, dialogue that addresses these issues is constructive and solution-oriented. This discourse includes ensuring that rural development includes protections for subsistence resources, cultural identity and lands, while providing needed infrastructure, services and employment training opportunities.

Emerging resource development opportunities, newly accessible maritime routes and public investment in construction and infrastructure will create an increased demand for educational resources and skilled workforces. The state university system, with industry and nonprofit partners, is actively engaged in delivering quality training and meeting the needs of a future workforce.

The balance between economic prosperity – which in Alaska rests on resource development – and socio-environmental health should result in more resilient communities. For rural Alaskans this means both active participation in cash and subsistence economies, in additional to traditional lifeways. 'Resilient communities' is an expression that captures both the intent and challenge of adaptability in planning for Alaska's Arctic future. The justification for addressing Arctic issues is not only to better understand increasing changes or human activity in the region, but to recognize the presence of Alaskans and their corresponding needs to enjoy a quality of life consistent with and responding to national standards, traditional ways of living and a remote Arctic environment.

Community engagement helps to find balance and build strong partnerships between local government, tribal and state entities and the private sector. Collaboration among these various levels occurs frequently and successfully in Alaska. Arctic communities affected by new development prospects are engaged during all phases of a project's development. Partnership also extends beyond the state, and Alaska is well-suited to lead national and international dialogue on resource development in the Arctic. Subject matter experts and state leaders lend a strong voice of knowledge and expertise to resource management and development opportunities as they emerge in the Arctic.

Safe and effective infrastructure relies on economic and resource development while contributing to community resilience. The state has invested heavily in infrastructure development. This development is critical not only to maritime transportation, but to moving goods and services between and to communities throughout Alaska. Investment in Alaska's transportation system is a perennial issue for state and federal agencies that weigh an ever-expanding list of needs against dwindling resources. Increased change and activity in the Arctic will place further demands on the state's transportation abilities. In the Arctic, a region where infrastructure often follows resource development, the majority of communities are not connected to the state or national road systems. Thus, maritime and aviation routes become more critical. Ports, airports, road and rail all play a significant role in the development of the region's resources, in

community resupply, safety and security, healthcare delivery and in future economic activity. The state of Alaska continues to have a fundamental position of addressing these necessary demands, the solution to which is a robust economy supported by active and prudent resource development.

Beyond transportation hurdles, Arctic peoples experience a demanding physical environment that can be harsh on structures like homes, schools, local government offices and health clinics. There is a wide array of efforts in place to address these issues, including a weatherization program, energy planning, applied research on power and energy and cold weather housing innovation. A long history of design and construction materials that are not responsive to northern and remote conditions has resulted in inefficient heating and electrical systems, poorly insulated or ventilated homes and structural deficiencies that are not able to withstand permafrost changes or freeze/thaw cycles. Alaska's Arctic geography and remoteness also make it difficult to build, maintain and provide reliable communication services at an affordable price. Even with the fast-paced change of communications technology, which brings more efficient and cost-effective solutions over time, the economics of statewide broadband infrastructure deployment remain challenging. The state is leading activities that address this challenge, working with the private sector to identify gaps and improve telecommunications.

One of the state's priorities – expressed in projects, planning and funding – is to see more affordable energy in every Alaskan community. Communities and regions are actively pursuing solutions to the high cost of energy through energy resource mapping, community consultation, partnerships, funding and proper permitting. While progress has been made, Alaska's rural communities pay the highest prices for energy in the United States, a difficult discrepancy to address. One major factor contributing to high costs is a lack of regional energy supply systems such as electrical grids or gas pipeline networks. For interconnecting villages, distance, lack of infrastructure and impacts of melting permafrost on existing infrastructure are huge and costly impediments. However, increased connectivity or the development of more efficient microgrids, (isolated systems individual to a community), have the potential to significantly reduce energy costs.

Substantial progress has been made on the development of local, often renewable, energy sources to offset some of the diesel fuel use.[6] In villages where residents must spend more than half of their annual income on fuel and electricity, even modest economic activity such as maintaining a local consumer economy, is severely limited. Reduced economic activity compromises the effectiveness of local governments, schools and utilities. Addressing high energy costs will incentivize Arctic industrial operations. In the recent past, the state legislature and the executive branch have created and funded many substantial programs and tools focused on energy and power issues.

Over the past 50 years the state of Alaska and its federal partners have supported community sanitation systems in rural Alaska. The state continues to put resources toward addressing rural water and sanitation needs, examining best practices and facilitating innovative solutions that result in healthier communities. Rural communities are devising innovative solutions to afford operations and maintenance bills for water and wastewater systems even as they respond to aging systems that are failing. In places with job scarcity and low household income, the cost of water is a significant economic issue that leads to household water rationing that escalates serious public health problems.

Combinations of socio-economic and environmental factors, preventive measures and clinical treatment, have the potential to significantly impact and improve Alaskan community wellbeing. A rapidly changing environment, evolving social and governance systems and increasing human activity in Alaska's Arctic exacerbate the challenges of providing adequate healthcare, medical emergency response and preventative services. Service capacity in the region – whether in the form of local or state government, federal agencies or Alaska Native health organizations – is increasing, and a high percentage of resources are allocated to respond to the area's needs. At the same time, many rural villages are actively working to address pervasive alcoholism and substance abuse problems, suicide and domestic and sexual violence. Many communities have some degree of law enforcement, which the state continues to address through investments in the State Troopers, Village Public Safety Officers, and Village Police Officers. Beyond additional resources, solutions do come with robust economic development and support for traditional ways of living.

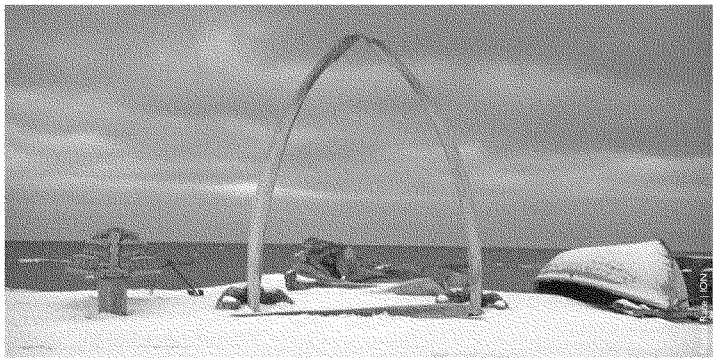
6 Irwin, Conway, Displacing Diesel May Prove Cost-Prohibitive in Rural Alaska, August 1, 2013.

One of the most crucial components of Alaska Natives' traditional ways of living is food security. Based on initial work in Alaska, the Inuit Circumpolar Council (ICC) found that food security is synonymous with environmental health, and includes the concepts of availability, accessibility, the Inuit ecosystem and identity, livelihood, preference of food, traditional knowledge, management, community and social networks, responsibility and accountability to educate youth, stewardship and the protection of the environment and culture.[7] Changing environmental conditions threaten food security by reducing the efficacy of subsistence hunting due to changes in the weather and ice, impacting subsistence species distribution and health and added strain on food preservation and storage. The economic, health, social, cultural and spiritual values of all Alaskan Arctic communities are closely tied to a subsistence-reliant lifestyle. Alaska is world-renowned for its diverse and abundant wildlife, ranging from some of the largest free-ranging caribou herds in the world to a wide variety of marine mammals including several iconic to the Arctic such as the bowhead whale and walrus. The region supports important nesting habitat for a wide range of waterfowl species. Alaskans also depend on sustainable fisheries for their sustenance, livelihood, and recreation. Fishing is a major source of food for Alaskans and a provider of employment and economic. This is an area where the state has excelled, in cooperation with many stakeholders.

7 North Slope Regional Food Security Workshop: How to Assess Food Security from an Inuit Perspective: Building a Conceptual Framework on How to Assess Food Security in the Alaskan Arctic. Inuit Circumpolar Conference, November, 2013.

MANAGING DEVELOPMENT AND FOOD SECURITY

A good example of how Alaska's Arctic communities have managed development and food security is the Red Dog Mine, which produces zinc, lead and silver ore from one of the largest base metal deposits in the world, and is owned by NANA Regional Corporation (NANA), an Alaska Native Corporation, and operated by Teck Alaska. Before initial development began, NANA directly engaged in a decades-long dialogue with their Inupiat shareholders to determine how resource development would affect their region. As a result of this extensive dialogue, NANA and Cominco (now Teck Alaska, LLC) signed an innovative operating agreement in 1982 that protects the subsistence resources of the Inupiat of Northwest Alaska and contributes to the regional economy with the production of valuable zinc and lead concentrate at the Red Dog Mine. The agreement also created a management and oversight committee consisting of members of NANA and Cominco and a Subsistence Committee consisting of Elders from neighboring communities who regularly work with mine officials to address local concerns regarding subsistence impacts. The mine has proven to be an economic catalyst in the region while protecting the traditional Inupiat lifeways.



There are many institutions, organizations, private sector and government agencies conducting research in the Arctic that collaborate with one another and with international partners to accomplish assessment, monitoring and modeling. A short list of priorities were identified as highly urgent problems including: economic and socio-economic factors affecting community wellbeing and ability to adapt; human physiological, behavioral and mental health; civil and industrial infrastructure planning; ocean acidification and its possible impacts on subsistence and commercial fisheries; tracking of trans-boundary contaminants and persistent pollutants and their cumulative impacts on Arctic inhabitants and ecosystems. There is a trend toward more community-driven research and the state of Alaska is -- and should be – increasingly involved in setting the research agenda. Alaska state agencies are active and engaged participants in these discussions at local, national and international levels and by actively monitoring trans-boundary contaminants (Department of Environmental Conservation), collaborating with the University of Alaska system to study shipping and related considerations for commerce and international trade (Department of Commerce Community and Economic Development), and monitoring, research, and managing fish and wildlife populations across the Arctic region (Department of Fish & Game).

Ensuring a sound economy and quality of life for its residents is a key concern facing the Arctic. Equally important is the protection of the environment. Rapid warming, reduced summer sea ice extent, thawing permafrost and a variety of other climate-related changes are affecting people and the physical environment in the Arctic.[8] Diminishing sea ice and ocean acidification has multiple impacts that change marine productivity and shift habitats and trophic structures in the ocean.[9] Persistent organic pollutants and heavy metals such as mercury, lead and cadmium originate from sources outside Alaska and reach the Arctic by air and water. Once present, they accumulate through the food web and affect the health of individual animals and humans. Alaska is concerned about the potential impacts of vessel traffic and development activity outside U.S. jurisdiction, transiting close to U.S. waters, from lower latitudes and over the poles as sources of pollution, litter and sewage that could have significant impacts on marine and terrestrial ecosystems and biodiversity. The Arctic region is particularly vulnerable to drastic climate-related changes such as: decreased summer sea-ice extent, increases in permafrost melt, glacial retreat, coastal erosion, ocean acidification and changing vegetation and wildlife patterns that will impact food security, national security and economic security.[10] Strong storms have increased in occurrence along the coasts and in the absence of summer and fall sea ice cover threaten coastal communities.[11]

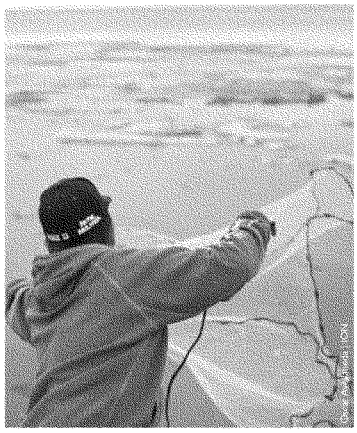
Climate change is a global challenge and Alaska's citizens and its economy should not bear the consequences of mitigation. Economic development provides funding for needed infrastructure that will empower Alaskans to adapt, respond and plan for changes that may result from sources beyond its jurisdiction. The state is actively monitoring and assessing major and irreversible impacts on biodiversity, ecosystems and the well-being of indigenous peoples and Arctic communities.

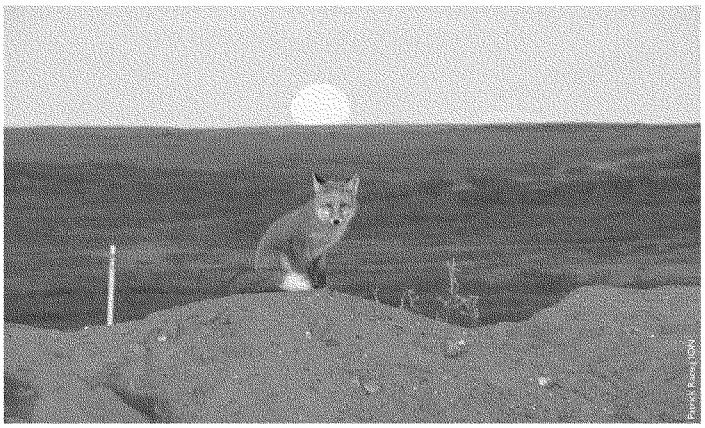
8 Arctic Report Card: Update for 2013. NOAA Arctic Research Program, December 12, 2013.

9 Hinzman L.D, Deal C.J., McGuire A.D., Mernild S.H., Polyakov I.V., and Walsh J.E. Trajectory of the Arctic as an integrated system. Ecological Applications, 23(8), 1837-1868, 2013.

10 Chapin, F. S., III, S. F. Trainor, P. Cochran, H. Huntington, C. Markon, M. McCammon, A. D. McGuire, and M. Serreze, 2014: Ch. 22: Alaska. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 514-536. doi:10.7930/J0027150.

11 Stewart, B.C., K.E. Kunkel, L.E. Stevens, L. Sun, and J.E. Walsh. Regional Climate Trends and Scenarios for the U.S. National Climate Assessment. Part 7. Climate of Alaska, NOAA Technical Report NESDIS 142-7, 60 pp., 2013.





Conclusion

This review demonstrates that economic, social, cultural and environmental health and well-being provide a fundamental and intentional starting point for the work and direction of the Alaska Arctic Policy Commission. Some key lessons emerge, however, from the previous overview:

- The state's economic and community growth depends on the prudent development of its rich resource endowment, most importantly on oil resources
- The state has a long history of successfully and responsibly developing said resources for the benefit of Alaskans and the United States
- The Alaskan Arctic requires special attention to protection of subsistence resources and the health of the environment on which they rely
- The food security of local residents and indigenous peoples is an intelligent measure by which to stake success and should encompass ecosystem and cultural health
- Alaskan communities remain challenged by insufficient water and sanitation systems, high costs of energy, distance to healthcare delivery and lack of transportation infrastructure.

The Commission has addressed these lessons directly and indirectly through its four strategic lines of effort and recommendations and can point to each as motivation – Economic and Resource Development, Response Capacity, Community Health and Science and Research.

The Alaska Arctic Policy Commission is building on a legacy of state efforts and believes that it is important to provide Alaskans with a well-vetted, comprehensive overview of the issues that impact the economic, social, cultural and environmental health and well-being of the region. These issues are balanced against the technical, physical and fiscal constraints facing the state and region; scope of the Commission's work and authority; and jurisdictional authority of the State of Alaska. Over the course of two years, the Commission has heard from a wide array of interest groups and partners about just how large and complex an issue Arctic Policy is now and will continue to be in the future. The following Alaska Arctic Policy and Implementation Plan demonstrate where focused attention is needed to have the greatest impact.

The Alaska Arctic Policy Commission submits to the Legislature for consideration this language for an Alaska Arctic Policy bill. It is possible that through the legislative process changes will be made.

An Act Declaring the Arctic Policy of the State

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

LEGISLATIVE FINDINGS AND INTENT

***Section. 1.** The uncodified law of the State of Alaska is amended by adding a new section to read:

(a) The legislature finds that

(1) the state is what makes the United States an Arctic nation;

(2) the entirety of the state is affected by the activities and prosperity in the Arctic region, and conversely, the Arctic region is affected by the activities and prosperity in the other regions of the state;

(3) residents of the state, having lived and worked in the Arctic region for decades, have developed expert knowledge regarding a full range of activities and issues involving the region;

(4) residents of the state recognize the risks that come with climate variability and emerging threats to ecosystems, as well as increased maritime activity, but are optimistic that the skillful application of expertise, coupled with circumpolar cooperation, will usher in a new era of economic and resource development that will improve the quality of life for residents of the state;

(5) the development of the state's natural resources in an environmentally and socially responsible manner is essential to the development of the state's economy and to the well-being of the residents of the state;

(6) respect for the indigenous peoples who have been the majority of the inhabitants of the Arctic region for thousands of years and who depend on a healthy environment to ensure their physical and spiritual well-being is critical to understanding and strengthening the Arctic region;

(7) the United States, other nations, and international bodies, including the Arctic Council, are rapidly developing Arctic strategies and policies, and therefore it is essential that both the state and the nation communicate the reality, richness and responsibility that comes with being in the Arctic, including communicating the need to provide safety, security and prosperity to the region;

(8) it is essential for the state and federal government to strengthen their collaboration on Arctic issues, including coordination when creating strategies, policies and implementation plans related to the Arctic, as both continue to engage in international circumpolar activity;

(9) the state should develop and maintain capacity, in the form of an official body or bodies within the executive or legislative branch, or both, to develop further strategies and policies for the Arctic region that respond to the priorities and critical needs of residents of the state.

(b) It is the intent of the legislature that this declaration of Arctic policy

(1) be implemented through statutes and regulations;

(2) not conflict with, subjugate, or duplicate other existing state policy;

(3) guide future legislation derived from the implementation strategy developed by the Alaska Arctic Policy Commission;

(4) clearly communicate the interests of residents of the state to the federal government, the governments of other nations and other international bodies developing policies related to the Arctic.

Sec. 2. AS 44.99 is amended by adding a new section to read:

Sec. 44.99.105. Declaration of state Arctic policy.

(a) It is the policy of the state, as it relates to the Arctic to,

(1) uphold the state's commitment to economically vibrant communities sustained by development activities consistent with the state's responsibility for a healthy environment, including efforts to

(A) ensure that Arctic residents and communities benefit from economic and resource development activities in the region;

(B) improve the efficiency, predictability, and stability of permitting and regulatory processes;

(C) attract investment through the establishment of a positive investment climate and the development of strategic infrastructure;

(D) sustain current, and develop new, approaches for responding to a changing climate;

(E) encourage industrial and technological innovation in the private and academic sectors that focuses on emerging opportunities and challenges;

(2) collaborate with all levels of government, tribes, industry and nongovernmental organizations to achieve transparent and inclusive Arctic decision-making resulting in more informed, sustainable and beneficial outcomes, including efforts to

(A) strengthen and expand cross-border relationships and international cooperation, especially bilateral engagements with Canada and Russia;

(B) sustain and enhance state participation in the Arctic Council;

(C) pursue opportunities to participate meaningfully as a partner in the development of federal and international Arctic policies, thereby incorporating state and local knowledge and expertise;

(D) strengthen communication with Arctic Council Permanent Participants, who include and represent the state's indigenous peoples;

(E) reiterate the state's long-time support for ratification of the Law of the Sea Treaty;

(3) enhance the security of the state through a safe and secure Arctic for individuals and communities, including efforts to

(A) enhance disaster and emergency prevention and response, oil spill prevention and response and search and rescue capabilities in the region;

(B) provide safe, secure and reliable maritime transportation in the areas of the state adjacent to the Arctic;

(C) sustain current, and develop new, community, response, and resource-related infrastructure;

(D) coordinate with the federal government for an increase in United States Coast Guard presence, national defense obligations and levels of public and private sector support; and

(4) value and strengthen the resilience of communities and respect and integrate the culture and knowledge of Arctic peoples, including efforts to

(A) recognize Arctic indigenous peoples' cultures and unique relationship to the environment, including traditional reliance on a subsistence way of life for food security, which provides a spiritual connection to the land and the sea;

(B) build capacity to conduct science and research and advance innovation and technology in part by providing support to the University of Alaska for Arctic research consistent with state priorities;

(C) employ integrated, strategic planning that considers scientific, local and traditional knowledge;

(D) safeguard the fish, wildlife and environment of the Arctic for the benefit of residents of the state;

(E) encourage more effective integration of local and traditional knowledge into conventional science, research and resource management decision making.

(b) It is important to the state, as it relates to the Arctic, to support the strategic recommendations of an implementation plan developed by the Alaska Arctic Policy Commission to encourage consideration of recommendations developed by the Alaska Arctic Policy Commission. Priority lines of effort for the Arctic policy of the state include

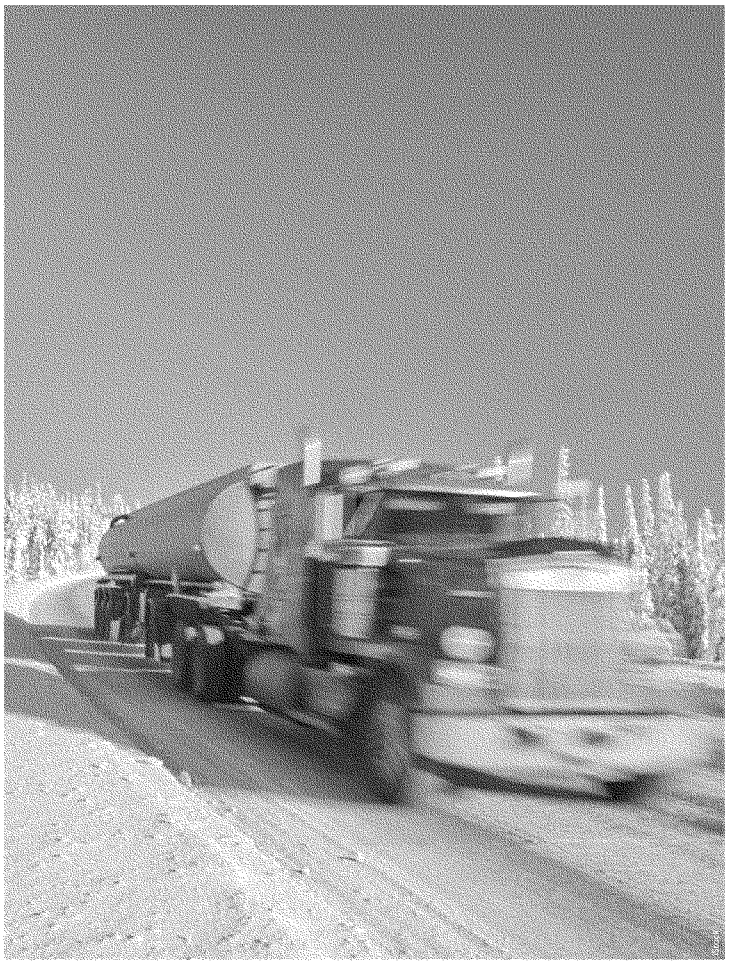
(1) promoting economic and resource development;

(2) addressing the response capacity gap in the Arctic region;

(3) supporting healthy communities; and

(4) strengthening a state-based agenda for science and research in the Arctic.

(c) In this section, "Arctic" means the area of the state north of the Arctic Circle, north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers, all contiguous seas, including the Arctic Ocean, and the Beaufort, Bering, and Chukchi Seas, and the Aleutian Chain, except that, for the purpose of international Arctic policy, "Arctic" means the entirety of the state.



Implementation Plan

Introduction

The Commission has framed its strategic recommendations around to four lines of effort – economic and resource development, response capacity, healthy communities, and science and research. As part of the Implementation Plan for the Arctic Policy these recommendations present a collective menu of options for consideration and evaluation by the Alaska State Legislature. The lines of effort in the Implementation Plan are those the Commission thought would benefit from immediate attention and state of Alaska leadership to build productive and collaborative partnerships.

These four lines of effort, ultimately address the socio-economic factors related to Arctic activity, while responding to change, opportunity and risk. The Commission considers these the building blocks from which areas that were not addressed directly – education, healthcare, language, domestic violence, etc. – can find innovative solutions that correspond to unique circumstance and statewide resonance. Alaska's Arctic must be both economically and environmentally robust, achieved through economic and resource development and respect for the environment upon which Alaskans depend.

Within each line of effort, Commissioners have identified strategic recommendations for priority consideration given their potential scale of impact. These have been further developed under the Implementation Plan as a suite of options for future action. The Implementation Plan provides 'shovel-ready' actions for consideration by state policymakers as interest develops and resources become available.

In an increasingly busy Arctic it is critical that Alaska proceed prudently. The work of the Commission is a culmination of the many years of effort, resources and attention the Legislature has devoted to further understanding the current and emerging challenges in the Arctic. Through this process the Commission has become aware and dependent upon coordination among jurisdictions, cooperation at all levels of government – including international, national, state, local and tribal – and sought to balance multiple values to protect, promote and enhance the well-being of the Alaskan Arctic including the people, flora, fauna, land, water and other resources. Alaska should fully engage and assume leadership now in order to ensure the development of policies that align with the priorities and needs of Alaskans.

Line of Effort #1 - Promote Economic and Resource Development

The Commission recognizes that natural resource development is the most important economic driver in Alaska, today and for the future. Alaska has successfully integrated new technology, best practices and innovative design into resource development projects in Alaska's Arctic and must continue to be a leader. The strong economy established by prudent natural resource development provides a base for Alaska's Arctic communities to thrive by creating new economic opportunities such as infrastructure, jobs, contracting services and community revenue sharing. The State must continue to foster an economic investment climate that encourages and promotes development of the Arctic.

A sound foundation encourages the creation and leverage of economic opportunity leveraged through stable and strong state and federal government investment; mobilization of capital by Alaska Native regional and village corporations; and local economies that are supported by tourism, fishing, arts and other small businesses. Investment is necessary to take advantage of Alaska's strategic location in the opening Arctic, which is critical to the nation's security and important to global shipping routes.

While the state is rich in resources, there are five major barriers and respective approaches to economic and resource development to consider:

- Capital Intensity – recognize that high capital costs are required to develop new infrastructure and natural resources in the Arctic and to address high energy and transportation costs in communities.
- Regulatory Uncertainty – advocate for sound regulatory policies that are legally defensible and minimize third-party lawsuits, which increase the risk and cost to project planning and discourage investment in the Arctic.
- Revenue Sharing - find new ways to cost-share between communities or with neighboring jurisdictions to ensure concrete community benefits distributed and embraced by Arctic residents.
- Distance to/from markets and communication centers – identify and invest in small-scale value-added businesses that displace outside dependence; evaluate and cultivate new markets; and invest in improved communication systems in Alaska's Arctic.
- Access – demand access to/through federal land holdings and consider state co-investment in resource-based infrastructure.

These concerns and considerations are critical when evaluating the Arctic. However, with increased national and international attention, the climate is ripe to implement an action plan to overcome basic challenges. The state should be strategic in its approach by leveraging assets currently in place and facilitating strategic investments. The state can do this by promoting competition and removing project barriers that promote sound sustainable investments and foster a climate for private investment.

Alaska's Arctic has an enviable resource base that, with careful consideration and state investment, will continue to produce returns to the state and its residents that ensure community health and vitality. Alaskans have long argued that economic development should not come at the cost of stewardship; federal agencies should respect Alaska's long-standing ability to deliver both.

Promote Economic and Resource Development, efforts to include:

- 1(a) Facilitate the development of Arctic port systems in the Bering Strait region to support export, response and regional development.
- 1(b) Strengthen or develop a mechanism for resource production-related revenue sharing to impacted communities.
- 1(e) Lead collaborative efforts between multiple levels of government that achieve predictable, timely and efficient state and federal permitting based on good information, sound science, clear legal foundation and reasonable economic feasibility.
- 1(d) Promote entrepreneurship and enterprise development.
- 1(e) Support and advocate for multiple-use of Arctic public and Alaska National Interest Lands Conservation Act (ANILCA) lands and promote prudent oil and gas exploration and development in the Arctic.
- 1(f) Increase economic returns to Alaska and Alaskan communities and individuals from maritime and fisheries activities.
- 1(g) Support the continued exploration and development of the Ambler Mining District, Mid Yukon-Kuskokwim River and the Northern Alaskan Coal Province.
- 1(h) Build on and promote Alaska's position as a global leader in microgrid deployment and operation to advance a knowledge-based export economy, creating new jobs and revenue for the state.
- 1(i) Encourage foreign and domestic private sector capital investment in Alaska's resource industries through stable, predictable and competitive tax policies.

Line of Effort #2 - Addressing the Response Capacity Gap

One of the primary motivating factors for addressing an "emerging Arctic" is the concern for human and environmental security in the face of increasing change and activity, even as that increased activity brings the benefit of additional response resources to the region. Alaska's response capacity – assets, planning, infrastructures to respond to oil pollution, search and rescue, or natural disasters – is measured by private sector, government, community and non-governmental resources. When considering strategic investment in infrastructure in the Alaskan Arctic, it is critical to understand the scope of the region in terms of its diversity and current resources. Differences in proximity, risk, geography and scale of challenge make evaluation of response capacity and the design of solutions difficult—a universal and encompassing approach is not plausible.

Time and distance are big logistic challenges for security and defense operations; Alaska's Arctic compounds these hurdles with a lack of communications and response infrastructure. Essentially, capabilities to address threat or aggression are sufficient; less sufficient are the capabilities to support the civil sector and execute oil spill and search and rescue response operations. The strains on these provisions are further stressed by the lack of 1) economic activity, 2) infrastructure, and 3) public awareness. Development of resources coincides with the ability to provide more adequate responses. This is extremely important as agencies and organizations responsible for responding are poorly resourced.

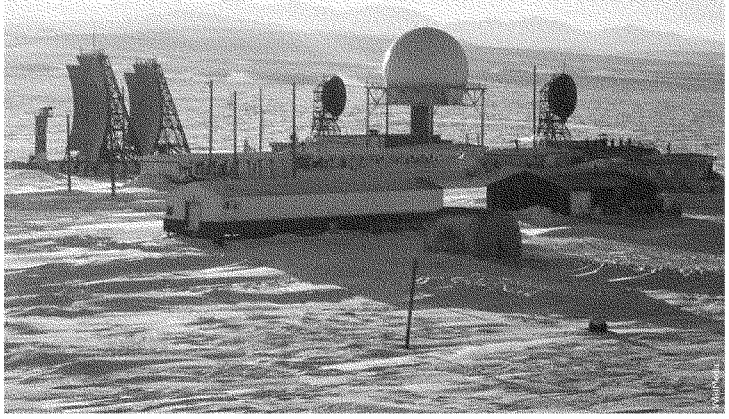
Industry carries the primary responsibility for prevention, preparedness and response; where economic activity or resource development occur the most response capacity can be found. Development of natural resources, shipping routes and tourism are activities happening on a global scale regardless of Alaska's participation. The lack of infrastructure and the speed at which global development in the Arctic is occurring should be a call to action. Response capacity will increase as economic opportunities are explored. Alaska's industry needs the tools and space to mature and prosper to establish appropriate safe guards to respond to the inherent

risks of our neighbors' development activities. Response resources will either be developed and provided by the companies, or through Oil Spill Response Organizations, the 'boots on the ground' for oil spill response. There is also a high level of very effective coordination and communication between the private sector, state and federal agencies and a collective recognition that no single entity can address Arctic issues, which reinforces the need for collaboration. The Alaska Regional Response Team is the state, federal and tribal coordinating body for response operations and is an effective mechanism for developing and implementing the Unified Plan and sub-area planning process, which provide a comprehensive guide to responding in the case of an oil spill with invaluable local input. Additional resources can be found in local government, e.g. the North Slope Borough currently conducts all Search and Rescue operations north of the Brooks Range.

Action is needed to enable the responsible development of resources; facilitate, secure, and benefit from new global transportation routes; and safeguard Arctic residents and ecosystems. Response infrastructure will by necessity require strong partnership and communication to prepare for incidents, respond, and develop best practices.

Address the Response Capacity Gap, including efforts to:

- 2(a) Ensure strengthened capacity within the Administration to address Arctic maritime, science, climate and security issues.
- 2(b) Support efforts to improve and complete communications and mapping, nautical charting, navigational infrastructure, hydrography and bathymetry in the Arctic region.
- 2(c) Expand development of appropriately integrated systems to monitor and communicate Arctic maritime information.
- 2(d) Facilitate and secure public and private investment in support of critical search and rescue, oil spill response and broader emergency response infrastructure.
- 2(e) Assure the state of Alaska Spill Prevention and Response programs have sufficient resources to meet ongoing spill prevention and response needs in the Arctic.
- 2(f) Strengthen private, public and nonprofit oil spill response organizations to ensure expertise in open water, broken ice, near shore and sensitive area protection; and be able to meet contingency plan requirements and operate effectively in the Arctic.
- 2(g) Ensure that a variety of response tools are readily available and can be deployed during an oil or hazardous substance discharge or release.
- 2(h) Foster and strengthen international partnerships with other Arctic nations, establishing bilateral partnerships with, in particular, Canada and Russia, to address emerging opportunities and challenges in the Arctic.



Line of Effort #3 - Support Healthy Communities

Increasing changes and activity in the Alaskan Arctic are likely to hold enormous implications for the health and well-being of its inhabitants. In turn, socio-economic systems must react as additional stress is placed on existing and future infrastructure and global processes impact local planning. There is a strong correlation between vibrant economies and healthy communities. Socio-economic and environmental factors that lead to such healthy communities can mitigate adverse health impacts that may emerge in the future.

In an increasingly busy Arctic it is critical that Alaska continue to engage in transparent public processes that involve stakeholders, lead to informed decision making and hold decision makers accountable. Transparency requires coordination among jurisdictions, cooperation at all levels of government – international, national, state, local and tribal – with clearly-defined functions and roles for each participant. Additionally important is the balancing of multiple values to protect, promote and enhance the well-being of the Alaskan Arctic including the people, flora, fauna, land, water and other resources. Much of these requirements currently exist.

Local governments with active resource development work collaboratively with the state and industry to support and sustain the communities in their region. This effort ensures that rural development includes protections for subsistence resources, cultural identity and lands, while providing needed infrastructure, services, and employment training opportunities.

The justification for addressing Arctic issues is not only to better understand increasing changes taking place or human activity in the region, but to recognize the region's residents and their historical roots. Residents of the Alaskan Arctic have engrained and established practices and needs to maintain in order to enjoy a quality of life consistent with and responding to national standards, traditional ways of living and a remote Arctic environment. With increased attention to the Arctic, local communities should see corresponding workforce development, revenue sharing and access to affordable energy and transportation.

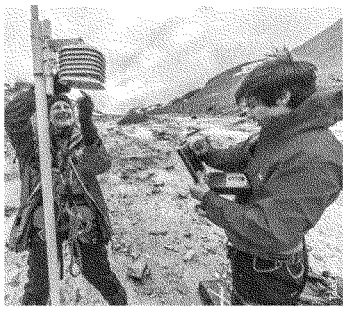
With sound economic opportunity for Alaskans the state can maintain a vibrant economy, driven by private sector growth and a competitive business environment that has the potential to deliver social benefits while responding to the needs for a healthy environment. The state of Alaska can seek a better quality of life for the whole Arctic region without compromising the economic security and well-being of other communities or the state as a whole; healthy marine and terrestrial ecosystems; and effective governance supported by meaningful and broad-based citizen participation.

Support Healthy Communities, including efforts to:

- 3(a) Foster the delivery of reliable and affordable in-home water, sewer, and sanitation services in all rural Arctic communities.
- 3(b) Reduce power and heating costs in rural Alaskan Arctic communities.
- 3(c) Support long-term strategic planning efforts that utilize past achievements, leverage existing methods and strengthen local planning that assesses and directs economic, community and infrastructure development, as well as environmental protection and human safety.
- 3(d) Anticipate, evaluate and respond to risks from climate change related to erosion and community infrastructure and services; and support community efforts to adapt and relocate when necessary.
- 3(e) Develop and support public education and outreach efforts that (a) enhance the understanding of the conservation of Arctic biodiversity and sustainable use of biological resources and management of natural resources and (b) promote public participation in development of fish and wildlife management plans within existing management systems and policies.
- 3(f) Enforce measures that protect and help further understanding of the food security of Arctic peoples and communities.
- 3(g) Identify and promote industry, community and state practices that promote sustainability of subsistence resources while protecting against undue Endangered Species Act (ESA) listings and broad-brush critical habitat designations.
- 3(h) Create workforce development programs to prepare Arctic residents to participate in all aspects and phases of Arctic development.

Line of Effort #4 - Strengthen Science and Research

Alaska's future prosperity largely depends on the scientific, technological, cultural and socio-economic research it promotes in the Arctic in the coming years and its ability to integrate science into decision making. Ongoing and new research in the Arctic must be designed to help monitor, assess and improve the health and well-being of communities and ecosystems; anticipate impacts associated with a changing climate and potential development activities; identify opportunities and appropriate mitigation measures; and aid in planning successful adaptation to environmental, societal and economic changes in the region.



The vast amount of science and research conducted in the Alaskan Arctic is performed by a broad spectrum of interests, from the public to the private sector and includes non-governmental organizations, the state University system and many others. It is crucial that the state of Alaska is involved in the various forums that build the information base available to policy makers. Though local and traditional knowledge and subsistence activities inform many of the above entities' research priorities, activities and findings, there is a need for more effective use of traditional knowledge. Inquiry into how researchers can better collaborate with local peoples and include traditional knowledge into their projects is receiving more attention.

Observational systems are among the most effective means for monitoring and documenting change, improving inputs to models and informing permitting decisions. They are also a valuable way to meaningfully involve Arctic communities in research activities. Process studies can add to this knowledge and help to reveal the forces shaping ecosystem structure and function. In addition, the transfer of findings from process studies to models can reduce uncertainties and improve the accuracy of projections.

While models have practical use in developing strategies for managing wildlife and for sustainable and adaptable communities, civil infrastructure and economic development infrastructure, there are also concerns regarding the identification of the limitations of models developed to aid in decision making. Even as baseline data and component parameterizations improve, decision makers must have a clear understanding of uncertainties present in model projections in order to evaluate contingencies and determine proper levels of precaution in management and strategic approaches.

To ensure organized state input to federal, local and institutional decisions on Arctic research and monitoring needs, a process is needed to establish state government priorities guided by state objectives in the region. As the state's engagement with Arctic issues increases, the executive branch will play an important role in improving coordination of state agencies' positions in matters related to Arctic research. Alaska should pursue strategies to broaden and strengthen the influence of its agencies, its academic experts and its local governments and associations.

Benefits include increasing the knowledge available to decision makers in both the public and private sectors; strengthening and refining the results of data synthesis; reducing duplicative research; and enhancing the effectiveness of interdisciplinary research efforts. More coordinated research efforts driven by state of Alaska priorities would have significant impact for policy makers and decision makers being able to respond to opportunities and challenges in the emerging Arctic.

Strengthen Science and Research, including efforts to:

- 4(a) Ensure state funding to, and partnership with, the University of Alaska for Arctic research that aligns with state priorities and leverages the University's exceptional facilities and academic capacity.
- 4(b) Increase collaboration and strengthen capacity for coordination within the Arctic science and research community.
- 4(c) Strengthen efforts to incorporate local and traditional knowledge into science and research and use this collective knowledge to inform management, health, safety, response and environmental decisions.
- 4(d) Improve, support and invest in data collaboration, integration, management and long-term storage and archiving.
- 4(e) Support monitoring, baseline and observational data collection to enhance understanding of arctic ecosystems and regional climate changes.
- 4(f) Invest in U.S. Arctic weather, water and ice forecasting systems.
- 4(g) Update hydrocarbon and mineral resource mapping and estimates in the Alaskan Arctic.

National and International Interests

The Alaska Arctic Policy Commission, as part of its two-year effort to identify the current state of the Arctic and make recommendations for responding to change and activity, recognizes that Alaska shares the region with others who have jurisdictional authority. The Bering Strait, for instance, is an international waterway; the federal government controls waters three miles beyond the state coastline and within the U.S. Exclusive Economic Zone; and federal agencies own and manage federal lands within much of the Arctic. Alaskans have undertaken significant efforts to provide for the needs of Arctic residents through natural resource development and environmental protection. The Commission encourages the continued cooperation and partnership with the federal government and with other national and international interests in the development of strategies and policies that assure a beneficial future for the region.

The Commission has produced a number of recommendations that speak to those issues outside its authority, as they relate directly to the health and well-being of Alaskans. The Alaska Arctic Policy Commission recommends that the U.S. government and federal agencies consider:

- Adopting federal revenue sharing with the state and impacted communities from resource development opportunities on the Arctic Outer Continental Shelf (OCS).
- Sufficiently funding the U.S. Coast Guard to execute its assigned and emerging duties in the U.S. maritime Arctic without compromising its capacity to conduct all Alaskan and nearby international missions.
- Replacing the U.S. Coast Guard's Polar Class icebreakers and increasing the number of ice-capable cutters.
- Applying current fisheries management regimes to emerging fisheries of the Arctic region.
- Supporting the economic well-being of residents of the Arctic by maintaining the ability to access and, where appropriate, prudently develop natural resources in State and Federal upland and offshore areas, including the: Alaska National Wildlife Refuge (ANWR) and oil and gas exploration and production in the 1002 area, National Petroleum Reserve in Alaska (NPR-A), and Alaska National Interest Lands Conservation Act (ANILCA) lands.
- Improving the safety of shipping by implementing – in cooperation with Alaskan experts – the International Maritime Organization (IMO) Polar Code.
- Adopting a vessel-route system through the Bering Strait; and engaging the itinerant shipping community to join and help fund a policy framework to prevent and respond to oil spills in the Aleutians, the Bering Sea and the Arctic Ocean.
- Sufficiently funding the federal agencies whose mission it is to provide baseline data, monitoring, mapping, charting and forecasting.
- Designating a single coordinating agency and identifying a designated funding stream that will be responsive to climate change impacts requiring community relocation.
- Ratifying the United Nations Convention on the Law of the Sea, ensuring freedom of the seas and clear navigation rights and national security interests while answering outstanding questions of the role of the International Seabed Authority and Article 234.

- Preparing the submission of an extended Continental Shelf claim beyond Alaska waters.

- Listening to and including Alaskans in federal decision-making now and in the future with emphasis on the Arctic Council process during the U.S. Chairmanship.

- Recognizing the unique and specific needs of Alaska in the development of policy, promoting approaches that accommodate Alaska conditions within federal efforts, such as the National Ocean Policy, Regional Planning Bodies and Marine Planning.

Specifically with regard to offshore development, the AAPC recommends to the federal government that it:

- Support Arctic-specific rules for Arctic OCS activity, including Bureau of Ocean Energy Management (BOEM) and Bureau of Safety and Environmental Enforcement (BSEE)'s Arctic-specific regulations under the Outer Continental Shelf Lands Act (OCSLA), and call for demonstrated continual improvement by both the regulators and the regulated operators to ensure the safest possible oil and gas operations on the U.S. Arctic OCS.

- Encourage federal regulators to standardize conditions for OCS exploration by moving conditions out of individual leases and permits and into the regulations themselves, recognizing that some degree of individualized conditionality is needed for flexibility.

- Support the State of Alaska in working with federal regulators toward a "near miss" incidents database and the design and installation requirements of Arctic-specific safety.

- Establish an ongoing state-federal public forum on Arctic OCS Risk Management and Process Safety.

- Encourage continued circumpolar cooperation between regulators and other stakeholders.

- Support coordination within and between federal agencies towards Integrated Arctic Management (IAM) to develop a practical tool that supports improved safety, risk management and project success.

Alaska Arctic Policy Commission

Legislative Members

Senator Lesil McGuire, Co-Chair – Anchorage
Senator Cathy Giessel – Anchorage
Senator Lyman Hoffman – Bethel
Senator Donny Olson – Golovin
Senator Gary Stevens – Kodiak
Representative Bob Herron, Co-Chair – South Bering Sea
Representative Alan Austerman – Kodiak
Representative Bryce Edgmon – Dillingham
Representative David Guttenberg – Fairbanks
Representative Benjamin Nageak – Barrow

Public Members – Representing:

Jacob Adams, Arctic Slope Regional Corporation
Nils Andreassen, Institute of the North (ION) – International Arctic Organizations
Dr. Lawson Brigham, University of Alaska Fairbanks – University
Peter Garay, American Pilots Association – Marine Pilots
Chris Hladick, City of Unalaska– Local Government
Layla Hughes, Consultant – Conservation
Mayor Reggie Joule, Native Village of Kotzebue; Kotzebue IRA – Tribal Entities
Stephanie Madsen, At-Sea Processors Association – Fisheries
Harry McDonald, Saltchuk – Marine Transportation & Logistics
Mayor Denise Michels, City of Nome – Coastal Communities
Liz Qaulluq Moore, NANA Regional Corporation – ANCSA Corporations
Stefanie Moreland, Alaska Department of Fish & Game – Office of the Governor
Kris Norosz, Icicle Seafoods
Lisa Pekich, ConocoPhillips Alaska – Oil & Gas Industry
Pat Pourchot, U.S. Department of the Interior – Federal Government
Stephen Trimble, Trimble Strategies – Mining Industry

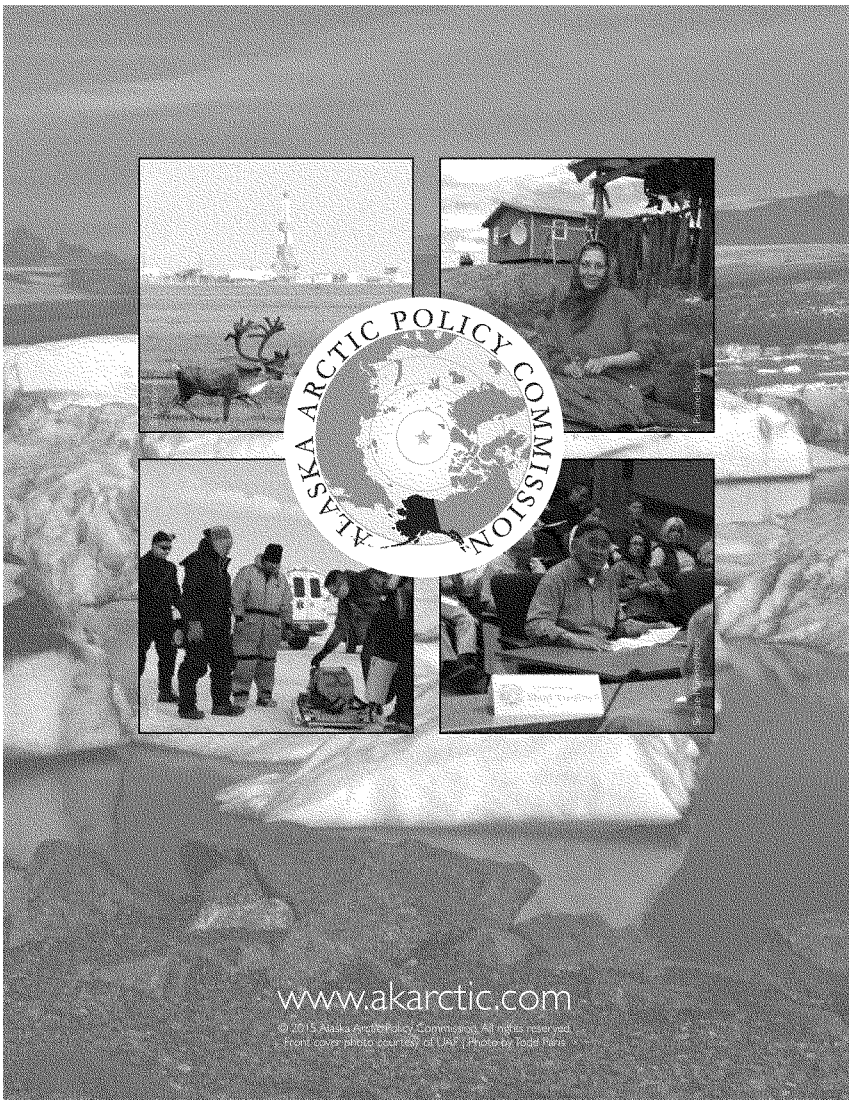
Ex-Officio Members:

Daniel Abel, Reab Admiral District 17 USCG and **James Robinson**, Arctic Planning and Coordination USCG; **Alice Rogoff**, Arctic Circle Co-Founder; **Dan Sullivan**, U.S. Senator; **Mead Treadwell**, Former Lt Governor; **Fran Ulmer**, Chair USARC.

Dr. Nikoosh Carlo – Executive Director, AAPC
Rob Earl – Arctic Policy Advisor, Representative Herron
Jesse Logan – Arctic Policy Advisor, Senator McGuire

The Institute of the North acted as a secretariat, providing staff support for planning, editing and facilitation.

The work of the AAPC benefited greatly from those across the state of Alaska and elsewhere who participated in official meetings, work sessions, listening sessions, and submitted written comments.



The CHAIRMAN. Thank you, and we do appreciate the good work of the Commission.

Let's go to Mayor Brower, Mayor of the northernmost borough in our great country. Welcome.

STATEMENT OF HON. CHARLOTTE BROWER, MAYOR, NORTH SLOPE BOROUGH

Ms. BROWER. [Speaking Inupiat language.] That's my first language. Chairman Murkowski, members of the Committee, my name is Charlotte Brower. I'm the Mayor of the North Slope Borough which encompasses 95,000 square miles. We're on a road-less system.

We have Nuiqsut, Kaktovik, Point Hope, Point Lay, Atqasuk, Barrow, Wainwright and Prudhoe Bay. Those are my areas that I'm responsible for.

I'm a wife of a whaling captain. I have six children, 25 grandchildren and three I'm very proud of that are in college. One to be a mechanical engineer so that one day that they'll be able to build a rig that could be environmentally safe for footprints of our tundra. I didn't say offshore. I said tundra.

I want to thank you for the invitation to address you. I'm always very happy because our people have lived in the Arctic since immemorial, and I want to give a valuable perspective of the dialogue today.

As I mentioned I want to thank, very much, our great Senator from our great State of Alaska, Senator Lisa Murkowski, who is part of us, who is always looking out for the needs of our Inupiat people. She's always been a very tireless champion for those of us who are often ignored by policy makers here in Washington and her leadership in Arctic issues is vital. Thank you, Lisa, for your friendship and support.

We also want to mention our new governor of our great State of Alaska, Bill Walker, our friend, House Speaker, Mike Chenault and Senate President Kevin Meyers for their leadership over Arctic issues. I believe we're going on a right track.

To talk about what our country must do to build upon its status as an Arctic nation, I must first share some history.

If you were to travel to the North Slope 70 years ago, you would find a semi-nomadic people subsisting off the land and living in sod houses much like their ancestors had for thousands of years. To have fresh water they had to melt ice and snow. To have heat they'd have to burn whale oil, and to travel from place to place they had to walk or use a dog team.

The discovery of oil in Prudhoe Bay changed the shade of history as how we see it today. In a period of roughly 30 years we experienced over 200 years worth of economic development and advancement. We formed a local home rule charter government and built roads, airports, schools, hospitals, houses and utilities. We created police, fire, first responder and search and rescue.

As I speak my whole North Slope region is experiencing over 60 to 70 miles per hour blizzard winds, with visibility very poor, but our people are very resilient. They have used their own local resources, our resources within the North Slope, to take care of any matters before we discuss any state disaster or national disaster.

Melting snow for water morphed to turning on a faucet. Whale oil was replaced by electricity and natural gas and dog teams gave way to automobiles and snow machines.

The property taxes we collect from oil and gas infrastructure still accounts for over 97 percent of the revenue collected by the North Slope Borough to provide local public services. It also generates private sector revenue streams and jobs through our native corporations that are shared with other native corporations throughout our great State of Alaska and are distributed as dividends to Alaska native shareholders.

These funds provide the economic life blood of our region. They allow us to be self sufficient, allow our communities to grow and even provide the means for us to support our subsistence activities. But as many of you know, our economic realities are changing.

Oil and gas production on Alaska's North Slope is shrinking. The Trans Alaska pipeline flows at a third of what it used to be. And the consequences of changing climate coupled with the large costs of building and maintaining vital infrastructure in the Arctic are overwhelming to the state and local government.

Just like our past, responsible resource development promises to provide the economic engine to provide future prosperity, but today those future prospects for developments lie on the federally-controlled lands and waters. And unfortunately our federal government does not seem to share the same enthusiasm as our state in the development of its resources.

Over the past few years our federal government has closed 50 percent of NPRA oil-to-oil and gas development, proposed wilderness designations for the oil rich coastal plain of ANWR and has refused to lease portions of the Outer Continental Shelf. It seems as if this current Administration is doing everything within its power to hamper or restrict resource development in our region.

This bias against resource development is also reflective in our country's Arctic strategy. Instead of focusing on initiatives that could improve the economic conditions of America's Arctic people, our government has chosen to side with powerful special interest groups and to focus on issues like climate change, creating new layers of governance over the Arctic and ideas for Pan-Arctic marine-protected areas.

The importance of these issues pales in comparison with the current needs of America's Arctic residents, and they fail to further their status as an Arctic nation. They provide no mechanism for things like the construction of ice breakers, transportation, infrastructure and other critical deficiencies. In some ways it seems like our national strategy for the Arctic is like fixing the mailbox while the house burns down.

We hope that our government will recognize the importance of economic security to those of us who live in the Arctic by including more specific economic and resource development initiatives during our Chairmanship of the Arctic Council, because if our federal officials were to consult us they might begin to understand that their current policies will lead us to a future where we struggle to provide basic public services. Where our subsistence practices and food security are put in peril because our people can no longer afford to hunt. Where our culture and communities wither because our resi-

dents are forced to leave our villages and move to the big cities. And where those that remain dwindle in the hopelessness of lost jobs and opportunities.

Our quest for self-determination will be replaced by a complete dependency on the government which we have worked very hard not to be.

Perhaps there are some hope to see us revert to the old ways, to live in igloos and travel by dog team, relegated to being mere exhibits in a large, open air, Arctic museum, but that is not the future that we want to leave to our children and grandchildren. No one has better appreciation of the importance of the Arctic than the Inupiat.

We are the first Arctic nation. Our spiritual connection with the land coupled with our knowledge and experience have enabled us to strike the proper balance between protecting the environment and developing our resources throughout our history. We have a keen understanding of what it will take to continue to grow the economic prosperity of America's Arctic people, and we've already demonstrated our willingness to lead through local initiative such as the Arctic Waterway Safety Committee and the North Slope Port Authority.

It is our hope that our federal policy makers will partner with us instead of opposing us so that we can build a strong Arctic nation together.

[Speaking Inupiat language.]

[The prepared statement of Ms. Brower follows:]

Testimony of Charlotte Brower
Mayor, North Slope Borough, Alaska
March 5, 2015

Before the
Committee on Energy and Natural Resources
United States Senate

Chairman Murkowski, Members of the Committee:

My name is Charlotte Brower and I'm the Mayor of the North Slope Borough. I'm also an Inupiaq Eskimo; and, in addition to being the wife of a whaling captain, I'm a mother to 6 children and 25 grandchildren. I want to thank you for the opportunity to provide comments on how the United States can build on its status as an Arctic nation. Since my people have lived in the Arctic since time immemorial, I feel I may be able to add a valuable perspective to the dialogue today.

First, I would be remiss if I did not mention how grateful we are to have our very own Senator, Lisa Murkowski, looking out for the needs of the Inupiat people and all those who live on the North Slope of Alaska. She has been a tireless champion for those of us who are often ignored by policymakers here in Washington and her leadership on Arctic issues is essential. Thank you Lisa for your friendship and support.

America is an Arctic nation. And that fact doesn't come as a surprise for those of us that live there everyday. But over the last decade we've seen an explosion of interest in the Arctic from nations across the globe, and now suddenly, everyone has an idea of how this part of the world should be managed.

Over the past few years we have watched our federal government outline its strategy for the Arctic as it prepares to assume the chairmanship of the Arctic Council. Sadly, this process has unfurled in the vacuum of our nation's capital- thousands of miles removed from America's Arctic people and without an opportunity for meaningful local input.

And while one of the thematic elements of our country's upcoming chairmanship comprises improving the economic and living conditions of

Arctic residents, it seems like our government is expending more time, energy, and focus on the other two elements of its Arctic strategy.

This fact is exemplified in the detailed plans laid out for the creation of a pan-Arctic network of Marine Protected Areas or other initiatives aimed to tackle black carbon and ocean acidification. On the other hand, the strategy for addressing economic and living conditions is limited to things like studies on telecommunication infrastructure, fresh water sources, and green-energy initiatives.

While some of these issues are important, they pale in comparison to the acute, current needs of America's Arctic residents and they fail to further our status as an Arctic nation. In some ways it seems like our national strategy for the Arctic is akin to fixing the mailbox while the house burns down.

Today we face a reality of hoping that our communities are not inundated by coastal flooding, hoping that our water and sewer services will function so we can enjoy luxuries such as a flush toilet, hoping that multiple families will not have to live together in cramped houses, or hoping that our children will be able to find meaningful full-time employment and that the cycle of drug and alcohol abuse and suicide will end.

These are the issues that concern Arctic peoples. If our country wants to be serious about Arctic issues, then it must formulate a strategy on how these types of issues can be resolved. This is where we stand ready to work with our federal policymakers.

The area in which our country most falls short in the Arctic arena is infrastructure. We simply lack the infrastructure we need to protect our national interests, our environment, the economy, and the health and wellbeing of Arctic peoples. And the most effective way that the federal government can promote the growth of critical infrastructure is through policies that promote and encourage economic development.

In America's Arctic, this means the development of natural resources.

If you were to travel to the North Slope 70 years ago you would find a semi-nomadic people subsisting off the land and living in sod houses much like their ancestors had for millennia. But the discovery of oil in Prudhoe Bay in the 1960's changed all of that.

In a period of roughly 30 years, we experienced over 200 years worth of development and advancement. We formed a local, home-rule government and built roads, airports, schools, hospitals, houses, and utilities. We provided police, fire, first responder, and search and rescue services. Our people went from burning whale oil to keep warm to having natural gas heaters.

The property taxes we collect from oil and gas infrastructure still accounts for over 97% of the revenue collected by the North Slope Borough to provide local public services. It also generates private sector revenue streams and jobs through our local and regional Native Corporations that are shared with other Native Corporations throughout the state and are distributed as dividends to local shareholders. These funds provide the economic lifeblood of our region. They allow us to be self-sufficient, allow our communities to grow, and even provide the means for us to conduct our subsistence activities.

Our experiences have also taught us that natural resource development and a healthy environment are not mutually exclusive goals. Billions of barrels of oil have been extracted from the North Slope without any significant spills or environmental damage. We have watched the Central Arctic Caribou herd, which calves throughout Prudhoe Bay, thrive. And our borough instituted a robust permitting system that drives the oil industry to minimize and mitigate negative impacts. As a result, our subsistence way of life has flourished along with our local economy.

But land management designations and policies aimed at blocking resource development across America's Arctic, will usher in the end of this era of prosperity. And when these decisions are made without meaningful local input, they are at best paternalistic, and at worst exploitative.

If our federal officials were to consult us, they might begin to understand that their policies will lead us to a future where we struggle to provide basic public services, where our subsistence practices and food security are put in peril because our people can no longer afford to hunt, where our culture and communities wither because our residents are forced to leave our villages and move to the big cities, and where those that remain dwindle in the hopelessness of lost jobs and opportunities. Our quest for self-determination will be replaced by a complete dependency on the government.

As a mother and a grandmother, the thought of leaving such a fate to my children and grandchildren is unbearable. If we are to build a strong foundation to support America's status as an Arctic nation, our Arctic strategy must include the safe and responsible development of our natural resources.

We would also like to see Congress acknowledge the disparity in federal revenue sharing laws by allowing Alaskans to share in the royalty revenue derived from outer continental shelf oil and gas leasing and development like residents of the Gulf Coast. The people that bear the greatest risks from these activities should be able to realize some of the benefit. These funds would go a long way in helping us to provide for the kinds of infrastructure needs we face and also allow us to respond to the challenges that a changing Arctic presents.

As one example of a local initiative aimed to confront the increased amount of shipping through Arctic waters, the North Slope Borough has partnered with the Northwest Arctic Borough, the City of Nome, and the Alaska Marine Mammal Commission in the formation of an Arctic Waterway Safety Committee (AWSC). The purpose of this organization largely consists of three main goals: 1) To bring together key stakeholders for the establishment of safe practices for vessel transit through Arctic waters from the Bering Sea through the Chukchi and Beaufort Seas; 2) To help ensure the long-term health of the Arctic ecosystem and marine mammals; and, 3) To help ensure the safety of all mariners at sea.

Membership of the AWSC will consist of representatives from subsistence hunting groups, industry representatives (such as oil and gas, tug and barge, and tourism), the regional municipal governments, a regional tribal organization, and the Alaska Marine Pilots Association.

The best practices developed by the AWSC will be shared with the U.S. Coast Guard and will be included in their Coast Pilot publication. Mariners traveling through the region will be required to comply with these best practices once established. It is our hope that the formation of the AWSC will help to regulate maritime traffic through U.S. waters and help to reduce risks to our subsistence hunters and marine mammals.

And in an effort to respond to the lack of ports and other transportation infrastructure on the North Slope, North Slope voters approved the

formation of the North Slope Port Authority. Governing the Port Authority will be a board of directors representing multiple local stakeholders. The Port Authority will be tasked with partnering with North Slope entities in the development of port and other transportation infrastructure through public/private partnerships. It is also hoped that the Port Authority will help prepare our coastal villages to respond to potential oil spills or other mishaps at sea.

These represent just two of the initiatives of local people to deal with a changing Arctic. And my message to this Committee is simply this—if our country wants to build upon its status as an Arctic nation, then it should work in partnership with the people who have lived there for thousands of years.

No one has a better appreciation of the importance of the Arctic than the Inupiat. We were the first Arctic nation. Our spiritual connection to the land coupled with our knowledge and experience have enabled us strike the proper balance between protecting the environment and developing our resources throughout our history. We have a keen understanding of both the challenges and opportunities to be found in the Arctic and we are anxious to share our knowledge with federal policy makers so that we can build a strong Arctic nation together.

Quyanaqpak (thank you very much) for the opportunity to address you today.

The CHAIRMAN. Thank you, Mayor Brower.
Let's go to Dr. Bitz, please.

STATEMENT OF DR. CECILIA BITZ, COLLEGE OF THE ENVIRONMENT, SCHOOL OF ATMOSPHERE, UNIVERSITY OF WASHINGTON

Dr. BITZ. Thank you, Chairman Murkowski, Ranking Member Cantwell and members of the Committee. I appreciate the opportunity to discuss Arctic climate change and new frontiers in an Arctic environmental research with you today.

The climate has changed in many ways across the globe since pre-industrial times. Global surface temperature has warmed about one and a half degrees Fahrenheit. The pace and characteristics of climate change are consistent with scientific understanding of the climate response to human activities.

For a region of its size the Arctic has experienced the fastest surface warming on Earth. In addition, the subsurface of the Arctic Ocean is warming faster than anywhere else in the world's oceans.

When I was a graduate student I first looked at the sea ice extent records from satellites when the record was half as long as it is today. We knew then that the sea ice extent was retreating, but the limited observations available did not signal the rapid decline in summer sea ice that we know today.

Now with expanded observations and understanding, we have developed global Earth system models with historical simulations of the Arctic sea ice loss in reasonably good agreement with reality. These models predict the Arctic will be nearly sea ice free by the end of summer, roughly at mid-century.

I've emphasized the loss of Arctic sea ice because it is an amplifier of climate change and air warmed over sea ice is transported towards the land surrounding the Arctic. Warmer air in winter increases the likelihood of freezing rain and rain on snow events. Both can significantly disrupt mobility of humans and animals. Subsistence hunters suffer twice with the difficulty of traveling and a diminished population to hunt.

Warmer air leads to thawing permafrost that can damage roads and buildings and lead to greater particulate runoff into the rivers and the Arctic Ocean, changing ocean chemistry and affecting fish and marine animals. Atmosphere and ocean warming are causing land ice mass loss which is the highest contributor to observed global sea level rise today. Greenland alone contributes one quarter of the global sea level rise, and sea level rise affects us all.

Arctic coastal villages are threatened by rapid coastal erosion from a combination of fine permafrost, sea level rise, greater wave heights and worse storm surges due to reduced sea ice.

In July 2007 I was an instructor at a course on sea ice that was an activity of the International Polar Year. More than 100 students and instructors were present at an Arctic village. We had grown accustomed to seeing sea ice set records. Though with the evidence surrounding us at that time, we did not predict that in September 2007, just two months later, the sea ice would shatter the previous record low by 20 percent.

Today I co-lead a community effort known as the Sea Ice Prediction Network which coordinates and leads scientists worldwide

to improve sea ice predictions from a few weeks to a few years in advance. Our prediction systems must blend the methods used to predict weather and longer term climate signals. Weather forecasting has a half century lead on sea ice forecasting.

But there is much we can do to make these systems much better, and with continued investment in observations and research I believe we could forecast optimal shipping routes and give coastal communities advance notice of offshore sea ice type and the potential for damaging waves. Our Earth system models today have the capacity to produce wide ranging information that is beneficial to society such as chemical cycling, near shore sea ice conditions and biological activity.

Arctic scientists are actively exploring the extent to which a changing Arctic can influence the lower latitude weather. For example, longer lasting colder outbreaks is one possibility. Our European colleagues have found that when their models include a more realistic Arctic forecasts improve in the lower latitudes as well.

Sustained observations are essential to our ability to predict the Arctic environment. Observations at a process level and across the Arctic are needed. An observing network of the Arctic Ocean sea ice and surrounding land is challenging to construct, but the payoff is clear.

Investments in Arctic research is essential to a safe and productive future for us all. U.S. research institutions are a key player in Arctic research because they offer scientific excellence and progress in Arctic science. University scientists are uniquely able to include undergraduates in our research and to educate the wider population.

I look forward to your questions. Thank you.

[The prepared statement of Dr. Bitz follows:]

Testimony of Cecilia M. Bitz
Professor of Atmospheric Sciences
University of Washington

Before the United States Senate Committee on
Energy and Natural Resources

Hearing on
United States Artic Opportunities

March 5, 2015

Thank you Chairman Murkowski, Ranking Member Cantwell, and Members of the Committee. I appreciate the opportunity to be here today to discuss Arctic climate change and new frontiers in Arctic climate research.

I am a professor in the Atmospheric Sciences Department in the College of the Environment of University of Washington. I am also faculty in the Program on Climate Change. My research focus is on climate and climate change in the high latitudes, especially involving ice. I use a variety of observations and models for my research, including sophisticated earth-system models. I have done fieldwork in the Arctic on land and sea ice and in the Antarctic on sea ice. I received the 2013 Rosenstiel Award for Oceanography and Meteorology and the 2013 Ascent award of the American Geophysical Union. I am a fellow of the American Meteorological Society. Last year, I was a Fulbright Scholar in New Zealand.

Recent Arctic Climate Change

Our climate has changed in many ways across the globe since pre industrial times. Global mean surface temperature has warmed about 1.5 F (IPCC, 2013). The oceans have also warmed substantially, especially the upper ocean at most latitudes

(Levitus et al, 2014; Abraham et al, 2013). The pace and characteristics of climate change are consistent with the scientific understanding of climate drivers due to human activities.

For a region of its size, the Arctic has experienced the fastest surface warming on Earth, particularly in winter (see Figure 1). In addition, the subsurface of the Arctic Ocean is warming faster than anywhere else on Earth.

Based on satellite observations for the 1979-2012 period, sea ice cover in the month of September has receded at a rate of 13% per decade, relative to the 1979-2000 average (Stroeve et al, 2012; see Figure 2). The area decrease in winter is smaller, at about 3% per decade. The thickness of sea ice has been monitored more sporadically, but observations show an overwhelming decline of a similar magnitude to the summer sea ice cover (Kwok and Rothrock, 2009). Arctic winters are still sufficiently cold to cause seawater to freeze and snow to fall. However, the ocean freeze-up is later, sea ice is younger (see Figure 3) and thinner, and more snow is falling into the open water (Hezel et al, 2012). Consequently, the sea ice does not insulate the atmosphere from the relatively warm ocean as well as it did in the past, especially in fall and winter before the higher ocean heat loss results in partial regrowth. This interplay explains why sea ice is retreating faster in summer than winter.

I have emphasized the loss of Arctic sea ice because it is an amplifier of climate change (Screen and Simmonds, 2010). Air warmed over the sea ice is transported towards the surrounding land masses, including Greenland, other ice caps, and regions with permafrost (Lawrence et al, 2008). The dominant contribution to global sea level

rise today is from land ice mass loss (glaciers, ice sheets, and small ice caps) (Church et al., 2011), and sea level rise impacts humans at all latitudes. Loss of snow-covered area on land is an amplifier of change as well, though less so than is sea ice.

Arctic Climate Change Impacts

Warmer air masses over the Arctic in winter increase the likelihood of freezing rain and rain on snow, both can significantly disrupt transportation by automobile, snow machine, and by foot (McAfee et al, 2014). Caribou and musk oxen have difficulty walking and pawing through snow to reach food in winter, and large die-offs have occurred after rain on snow events (Grenfell and Putkonen, 2008; Rennert et al., 2009). Subsistence hunters suffer twice with difficulty traveling and a diminished population to hunt.

Thawing permafrost can damage roads, houses, buildings, and pipelines. Arctic tundra overlying permafrost has unique features, such as braided rivers and temporary thaw ponds and lakes known as thermokarsts. Thawing permafrost can at once make lakes more common and then cause them to disappear when the permafrost melts entirely (Smith et al 2005). Thawing permafrost leads to greater particulate runoff into rivers and into the Arctic Ocean, changing the mineral and nutrient cycle in the Arctic Ocean and affecting fish and marine mammals.

Arctic coastlines are experiencing rapid coastal erosion from a combination of thawing permafrost and greater wave heights and worse storm surges due to reduced sea ice (Barnhart et al, 2014). Regions with high ground ice content and low-lying coastlines, which are frequent along the north shore of Alaska, are particularly

vulnerable. At Drew Point, Alaska, the duration of the sea ice-free season increased from 45 to 95 days between 1979 and 2009 (Barnhart et al, 2014; see Figure 3). Storms are particularly treacherous in autumn, where the offshore waters are now much more often sea ice free. Just east of Drew Point, the coast eroded over 60 feet in 2012 compared to an average of 22 feet in a year for 1955-1979 (Barnhart et al, 2014).

Sea ice loss is tied to greater absorption of sunlight, especially over continental shelves where loss of sea ice coverage in summer has been greatest. Some areas of the continental shelves have ice in the sediments that contain methane. Some studies have argued that methane is released at a greater rate when permafrost on land and/or ocean sediments thaw (Kort et al, 2012).

Sea ice is host to an array of organisms that are integral to Arctic ecology (see Figure 4). Most people realize it is a platform for polar bear foraging and seals to haul out and raise their young. Yet, in reality it is a much more holistic player (Post et al, 2013). When it melts, organisms living within the ice are released into the ocean precisely when light levels are highest and the ocean is most stable, so the released materials effectively seed the ocean bloom. Many fish and whale populations, important to human, are tied to the sea ice edge.

Arctic Research Program Examples and Gaps

Given the importance of sea ice today for transportation, shipping, and industry, there has been a concerted effort to forecast the sea ice conditions each summer since 2007. Researchers and operation forecast centers have been developing the forecasting systems to predict sea ice from a few weeks to a few years in advance. These systems

are a blend of the methods used to predict atmospheric weather and longer-term climate signals. A few forecast systems have published retrospective forecasts, and they show skill at predicting Arctic-wide sea ice extent for at least four-month lead times. Drivers of sea ice conditions in the near term include the starting point of sea ice thickness and concentration and ocean heat content.

I co-lead a community effort known as the Sea Ice Prediction Network, which coordinates and leads scientists worldwide to improve sea ice prediction (Bitz and Stroeve, 2014). Many of us at the University of Washington are active participants. Weather forecasting has a half-century lead on sea ice prediction. There is much more we need to do to make these systems realize their full potential. An important component of our work is to find out what information is needed by stakeholders, including members of the public, industry, and governments. Our leadership team incudes experts on science communication and stakeholder engagement. With continued investments in observations and research, we could forecast optimal shipping routes and give coastal communities advanced notice of offshore sea ice type and the potential for damaging waves.

Arctic climate has a clear impact on the lower latitude ocean and atmospheric circulation. Researchers are actively exploring the extent to which a changing Arctic can influence the lower latitudes, with longer lasting cold air outbreaks as one possibility (Francis and Vavrus, 2012). In any case, when global forecast models include more realistic Arctic sea ice and other variables, forecasts improve in lower latitudes (Scaife et all, 2014; Jung et al, 2014).

Because the Arctic is highly responsive, human influences on atmospheric warming are a very important driver for Arctic environment predictions in the future after about 3 years. Environment outlooks in the 3-20 year range are valuable for preparing for new opportunities and challenges in the changing Arctic environment. Outlooks can also help us make decisions about what we want to avoid. The information could be used to plan for military vessel investments, economic opportunities, and resource management. While climate models have been used to predict multi-decade and century long Arctic change, they can be used to make more detailed predictions in the nearer term too (see Figure 5). New efforts should target this 3-20 year lead time and present information in all seasons. Investment are needed in model development and high-performance computing to predict a greater range of environmental factors, such as chemical cycling, near-shore sea ice conditions, biologic productivity, wave heights, and other small-scale processes.

Observations are essential to our ability to predict the Arctic environment. Observations at a process level and across the Arctic from remote sensing and in place are needed. An observing network of the Arctic Ocean, sea ice, and surrounding land is challenging to construct, but the pay off is clear.

University of Washington researchers have a history of developing innovative instruments to make measurements less difficult in the Arctic. Our scientists are developing robotic instruments such as seagliders (see Figure 6), an autonomous underwater vehicle (AUV) that can travel under ice for many days collecting and storing

data taken down to about 3000 feet in ocean depth. Seagliders are reusable, propeller free, and use very low power.

University of Washington also has lead long-term ocean and ice monitor efforts at the North Pole and Bering Strait using ocean moorings to make hourly measurements at a fixed point from the surface to full ocean depth. The Bering Strait is a gateway of heat transport into the Arctic from the Pacific Ocean. Ocean heat content and sea ice immediately north of the strait respond sensitively to the ocean heat flow (see Figure 7). Our instruments monitor currents that are important to shipping in the strait. We also observe nutrients and ocean chemistry so we can understand factors that influence Arctic fisheries and marine mammals. These data are being used to validate models of the Arctic to improve our understanding of the Arctic environment and make better predictions.

Investments in Higher Education

The University of Washington has taken a leadership position in Arctic research, building exceptional depth and breadth in the natural and social sciences and policy. We are investing in an even stronger program with our Future of Ice Initiative, through new investments in faculty and facilities to accelerate research. A signature of the initiative is to create new opportunities that bridge disciplines. We have a new Arctic Studies minor and a graduate seminar that introduces students to interdisciplinary, policy-relevant themes. Our program is a model for investments that could be made in Arctic Studies in other universities. Learn more at http://ice.uw.edu

Investment in Arctic research is essential to a safe and productive future. Universities are a key player in Arctic research because they offer scientific excellence and expertise in wide ranging areas that are essential to new discoveries and progress in Arctic science. University scientists are uniquely able to include undergraduate students in the research program and educate a large population about the Arctic. In addition, universities and industry have an excellent history of collaborating to solve problems and develop new technology. However, the proportion of Arctic scientists in academic positions is small compared to other sciences owing to the high demands of field work in the Arctic. Investments in universities are particularly important to train the next generation of students and post-doctoral researchers in Arctic studies. It is important for universities to educate the next generation who will inherit the environment that we oversee today.

Figures

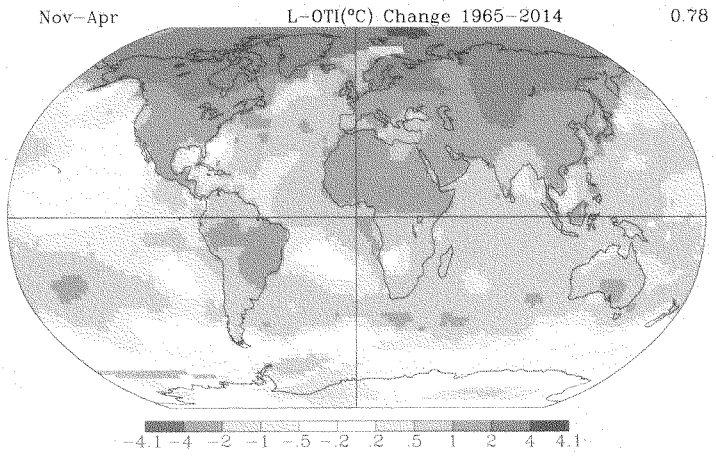


Figure 1. Surface temperature trends in degrees Celsius from 1965-2014 for November to April from the NASA GISSTEMP analysis. Generated on 26 Feb. 2015 from http://data.giss.nasa.gov/gistemp/maps/

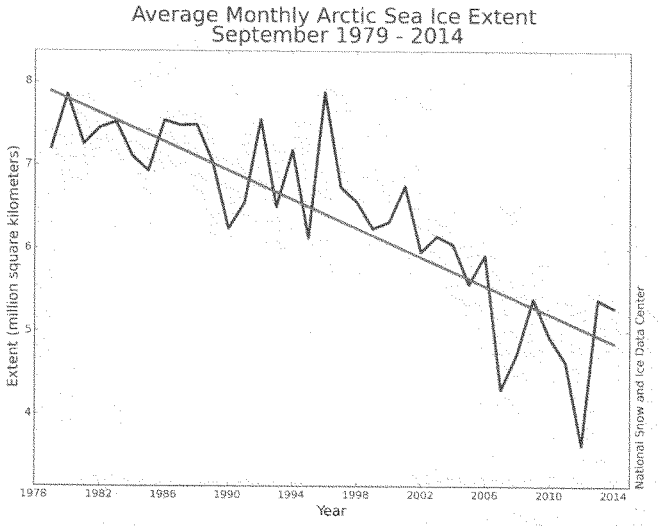


Figure 2. Arctic sea ice extent in September from 1979 to 2014. Data are from passive microwave satellite using the NASA team algorithm. Each of the lowest 10 years in this recard occured in the last decade. Figure downloaded from the National Snow Ice Data Center, retrieved 2 March 2015 from http://nsidc.org/arcticseaicenews/2014/10/.

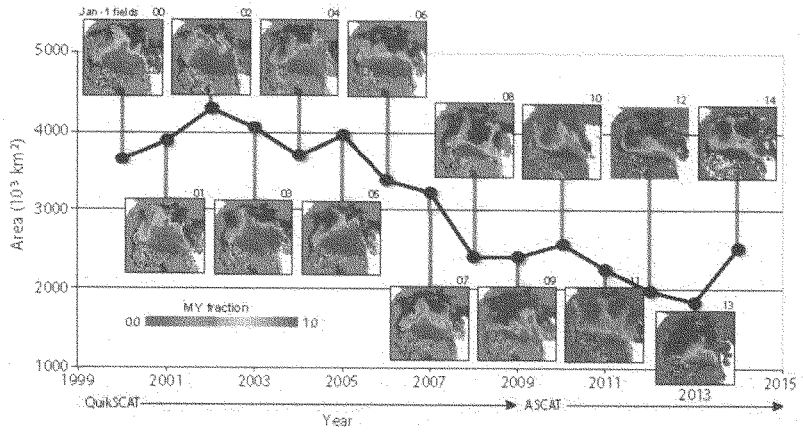


Figure 3. Fraction of Arctic sea ice in January that has survived the previous melt season. Data are from QuikScat (NASA) and ASCAT (EUMETSAT) satellites. Figure courtesy of Ron Kwok, updated from Polyakov et al (2011).

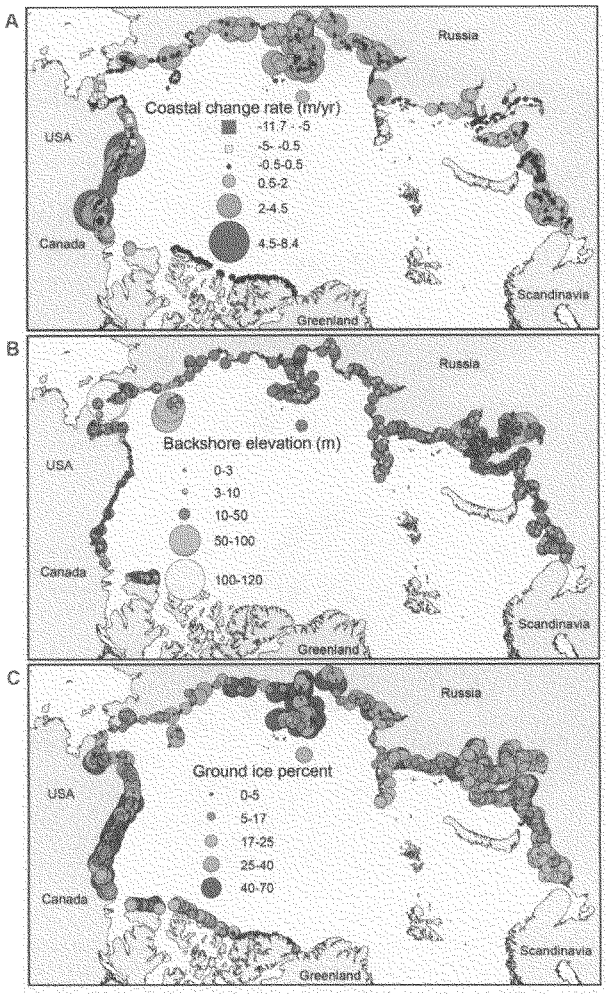


Figure 3. Coastal position change from erosion (positive numbers) and deposition (negative numbers) (a), backshore elevation (b), and ground-ice concentration (c) from Barnhart et al. (2014). Deposition occurs in northern Alaska near the Colville and Mackenzie River deltas. High backshore elevation or low ground ice content can reduce coastal vulnerability. Much of Northern Alaska has low backshore elevation and high ground ice content.

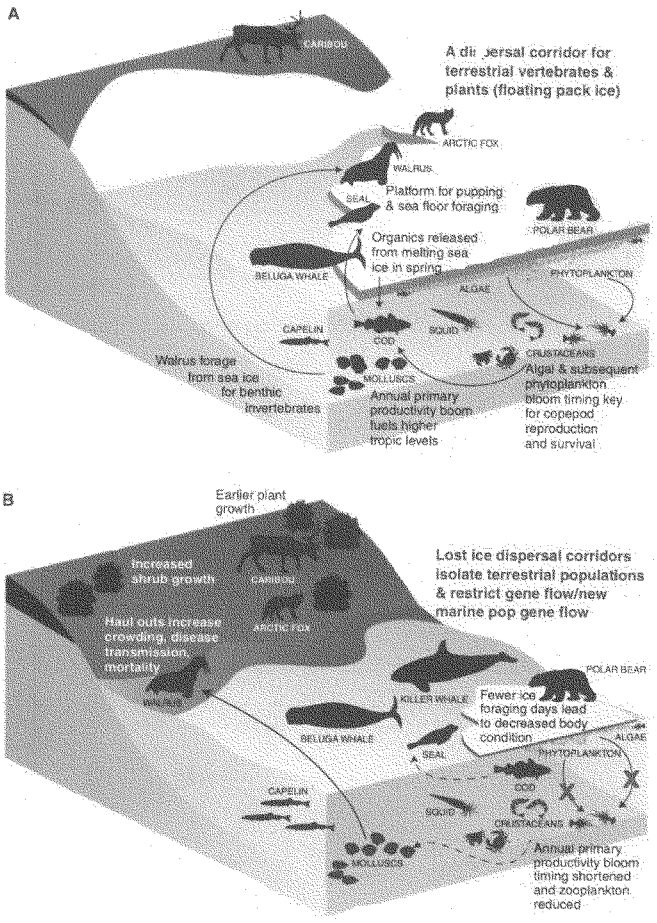


Figure 4. Ecological distribution of marine and terrestrial species influenced by sea ice (a). Outlook of distribution change in a warmer Arctic with diminished sea ice (b). From Post et al (2013).

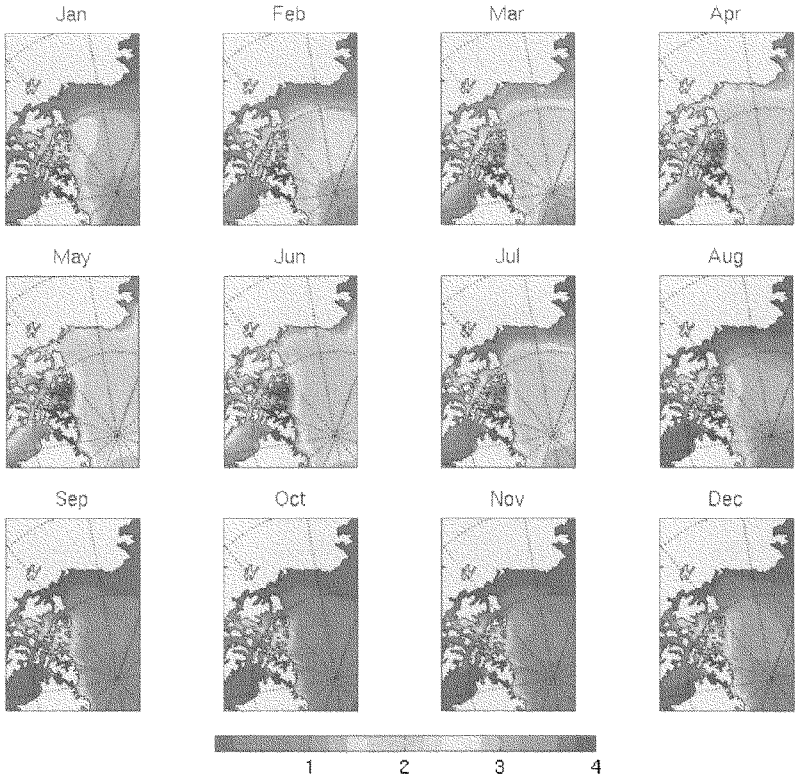


Figure 5. Sea ice thickness in meters along the Alaskan coast and Canadian Archipelago by month for 2023-2028. Predictions are averaged across a subset of models from global climate models from the Fifth Coupled Model Intercomparison Project that compare well with observations (Massonnet et al, 2012).

Figure 6. Sea glider tested under sea ice in the Davis Strait. Robotic instruments like these are making observations under ice that were previously impossible to gather. Photo courtesy of Craig Lee.

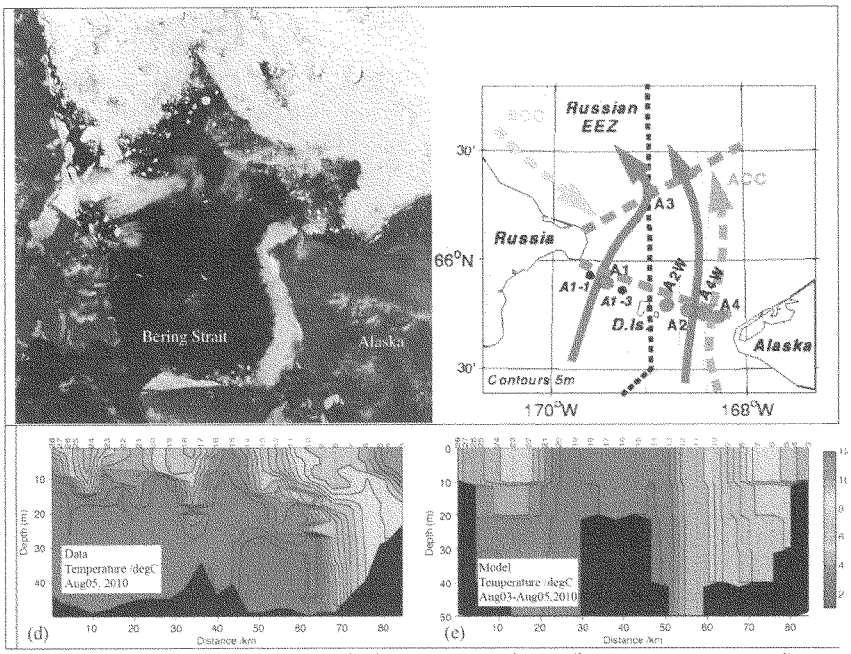


Figure 7. Bering Strait network of moorings (red dots in upper right panel) monitor temperature, salinity, and other parameters of seawater flowing through the strait. Heat transported into the Arctic through the Bering Strait is an important control on the sea ice extent to the north (upper left panel, 17 June 2013 from Modis, NASA Worldview). Temerature measured by the moorings is compared with a model in lower panels. Figure courtesy of Rebecca Woodgate.

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The CHAIRMAN. Thank you, Dr. Bitz. I appreciate your comments this morning and your being here.

Finally let's go to Mr. Arnold. Welcome to the Committee.

STATEMENT OF PATRICK R. ARNOLD, DIRECTOR OF OPERATIONS AND BUSINESS DEVELOPMENT, MAINE PORT AUTHORITY

Mr. ARNOLD. Thank you, Madam Chair. I am privileged to join you all on this fine Arctic summer day.

I'd like to thank you for allowing me the opportunity to speak on these opportunities in the Arctic. I'd like to especially thank Senator Murkowski and Senator King for the leadership they're showing working together in forming an Arctic Caucus and Senator Cantwell for acknowledging Maine's recent leadership in this and calling me as a witness.

If there were one take away from this hearing, I would hope it would be that anything in the Arctic requires cooperation and that openness that sometimes does not come easy.

Since 2013 the Icelandic steam ship company Eimskip established its single U.S. port of call in Portland, Maine connecting Maine directly for the first time in decades to Scandinavia, Northern Europe, Iceland, Greenland and Newfoundland. This shift brought Maine as close to these countries from a freight/cost perspective as it is to the Mid-Atlantic. Through a close collaboration with Iceland, Maine has entered into dialogue and trade relations with several Arctic nations in the high north and has been establishing relationships based on trust and mutual consideration.

Our approach has been simple. Build trade and mutual economic opportunity and all else will follow. We believe this to be true.

At the Arctic Summit Symposium titled, "Leadership in the High North" held in Bangor, Maine in May 2014, hosted by the Maine National Guard and the U.S. Coast Guard, retired North Com General Jacoby, said in regards to the Arctic, "Build the rail and the cavalry will follow." The rail being, we believe, economic opportunity and collaboration and the cavalry in this case perhaps being ice breakers.

Maine's activities in the high north, starting with trade lanes set up by Eimskip, have opened opportunities in cultural, educational and political exchanges that have benefitted Maine as well as the countries and people we exchange with. Through this exchange we work towards stability in our Arctic relationship in an environmentally sensitive and culturally inclusive manner and we endeavor to lead by design. This is who we are in Maine.

In order for trade lanes to be well established, I agree that the administrative focus on safety, security and stewardship regarding the Arctic Ocean is what is needed. Additionally, with the goal of improving economic and living conditions in this region, as this can be done with trade as well.

As a former navigation officer on U.S. Jones Act ships, I spent time navigating waters globally including as a navigation officer on cruise ships with Norwegian Cruise Lines that transited between Seattle and Alaska as well as the waters in Hawaii. Arctic shipping lanes would benefit by charting routes and understanding the region's unique navigational challenges with real time mapping of ice

flows being one such challenge. While there are geo-political implications of any action in this region, there are priorities that are more important such as the safe ability to transit these waters and visible participation supporting right of innocent passage as implied in the Law of the Seas.

With the Trans Polar route being the furthest from being ice free and the northern sea route and the Northwest Passage both requiring cooperation, the U.S. would be well served in ratifying the Law of the Seas.

Ice breaking is the lowest hanging fruit for the U.S. to jump into Arctic assistance and Arctic development. Without this capability the U.S. does not have the opportunity to lead in a meaningful way regarding support of future trade lanes or present natural resource opportunities or contributing to search and rescue commitments.

Maine is merely an example of how this nation can lead alongside Alaska in Arctic affairs.

First, opening lines of trade that allow for mutual prosperity, and then building on top of these trade lanes policies and opportunities for cultural and educational exchange that lead to lasting relationships.

This will be important given the rapid change in Arctic conditions due to climate change. Regardless of opinions, change is inevitable and what matters is how we adapt to it while mitigating the negative aspects of human contribution to it. We can only improve and prosper more by working together with the people and the countries in the Arctic.

Thank you.

[The prepared statement of Mr. Arnold follows:]

SOLIDG

Patrick R. Arnold
Director of Operations and
Business Development
Maine Port Authority
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The state of Maine's proximity to the High North, and its Arctic resources and partners, has furnished Maine with a unique role in Arctic affairs. In January of 2013 the Icelandic Steamship Company Eimskip moved its United States containerized freight operations to the in the Port of Portland, Maine. This terminal had recently been refurbished, in part, utilizing $5million in TIGER 1 funds received from the USDOT. Eimskip brought to Maine for the first time in 40 years direct freight connections to Northern Europe as well as Scandinavia, Iceland, Greenland and Eastern Canada. Eimskip's presence on these niche trade lanes has provided Maine a unique opportunity to open new markets for Maine and New England based businesses. For a State such as Maine niche opportunities represent sustainable business. Maine's access to these markets is as close as markets in the mid-Atlantic states in the US from a cost perspective.

The economic development afforded through Eimskip's connection to Iceland and points throughout the High North, has served as the cornerstone on which Maine is building cultural, educational and political opportunities. The cultural affinity Maine has for northern cultures including Scandinavia, Newfoundland, Quebec and Greenland, generates genuine interest in exchange.

While Maine is interested in the long term sustainable niche opportunities in the high north and arctic, the immense oil, gas and mining opportunities throughout this region will have an impact on the United States, overtime, in one way or another. The impacts of climate change will affect this region and its resources and the United States should be aware as to how, and how to play a helpful, responsible and stabilizing role in these changes. As a nation, we must adapt to changes in the environment.

Maine is a gateway for the Eastern United States to the high north and Atlantic Arctic related. With nearly 60% of the US population living east of the Mississippi River, ocean shipping from China through the Arctic to the US Eastern Seaboard represents opportunities that will impact the American economy. While Maine will continue to lead the Northeastern U,S, through its connections to partners in the High North, the United States has several considerations to make regarding it's national participation in Arctic Developments. These considerations include

- Appointing a United States Ambassador to the Arctic
- Acceding to the United Nations Convention on the Law of the Sea
- Examining the need for long-lead investments in infrastructure, like ice-breakers and search and rescue assets
- Evaluating the unique challenges Arctic shipping faces, from claims of ownership over international straits to the emission of black carbon that contributes to a climate feedback effect to inadequate charting
- How and whether the United States can continue to work cooperatively with Russia on Arctic issues, even as other aspects of the bilateral relationship are under significant strain
- The impact of changes on the people of the Arctic, whether they live in Alaska, Canada, Finland or other parts of the region

Regardless of the continental U.S. awareness of the changes taking place in the Arctic – there will be an impact and it will affect us all.

Patrick R. Arnold on behalf of MAINE PORT AUTHORITY

MUTUALLY BENEFICIAL OPPORTUNITIES IN THE ARCTIC FOR THE UNITED STATES

PRESENTED TO THE SENATE COMMITTEE ON ENERGY & NATURAL RESOURCES
BY PATRICK ARNOLD ON BEHALF OF THE **MAINE PORT AUTHORITY** AND **SOLI DG**

The CHAIRMAN. Thank you, Mr. Arnold. We appreciate you being here today as well.

We'll now turn to a round of questions from the members here.

I want to let my colleagues know that in addition to what Senator King and I are doing with the Arctic Caucus, I'm looking to develop an Arctic infrastructure type bill that—well it's not the deep water ports. It's some of the basics that, I think, most folks assume we have in place up in our Arctic waters.

First and foremost is better charting, better hydro graphic charting. If we're going to see the level of commercial activity that we are seeing, we need to know that we have accurate maps and charts. In addition things like weather stations and ice forecasting as Dr. Bitz has mentioned are imperative for us. Weather buoys, electronic buoys, navigational aids that assist us.

So when we look to some of the budget, and I know this isn't a budget hearing, I will tell you that I become concerned that we're not seeing the budget priorities placed in areas that we could be making a difference. NOAA's budget has a reduction in their ocean exploration and research program which effectively is the area that looks to the mapping and the charting issues. In addition, I'm always worried about our Coast Guard budget, always worried that we ask so much of our Coast Guard men and women and we don't resource them properly.

So we've had a lot of discussion about the need for an ice breaker, a billion dollar proposition, but the fact remains that it is more than just an ice breaker. The funding for Arctic operations in the budget is actually down. We need to make sure that we are resourcing appropriately. Admiral Papp, you mentioned that specifically in your comments.

You also mention, Admiral, that there is perhaps a misperception out there about the Administration's position or support for the Arctic Economic Council in promoting economic development within the Arctic. We clearly heard from Mayor Brower as well as our two members of the Alaska legislature the imperative for economic opportunity. Can you speak to that misperception and perhaps clarify?

Admiral PAPP. Yes, Madam Chairman. It came across loud and clear when I started listening sessions that there was both confusion and disappointment over the way we approach the Arctic Economic Council. I would say as I've had a chance to put this back together and look at it over the last six months, we may have approached it differently if I understood the issue but that was already in motion by the time I came into this job.

What I would say is I think each one of the eight countries have approached it a little bit differently. The United States, in particular, is, I think, different and comes into an apples and oranges comparison because many of the other countries in the Arctic Council own companies. There are government-owned companies that are then selected by the government and placed in positions on the Arctic Economic Council.

As we all know, we have a culture in the United States of staying out of private industry. And granted, there's regulations and other things, but the federal government does not own industries.

So we approached it from a different perspective and asked that the Canadians, when they put out their solicitation, to go to the Alaska Chamber of Commerce and ask them for input on the companies to be representing the United States on the Arctic Economic Council. So we did approach it differently. I think the Alaskans should be pleased that they were able to pick their companies to represent us, and as I look across all the companies that are represented or lobbying type firms that have been recommended by the other countries, not one of the countries have approached it exactly the same.

It's one of the issues that we intend to take on during our chairmanship to clarify the role of the Arctic Economic Council. It's very high on our priority list in terms of strengthening the Arctic Council. We value the input of industry and these companies, and we will look on how we can improve and move away from this misperception of our lack of support for it.

The CHAIRMAN. Well, I thank you for that clarification. As you know it was an issue that I raised with Secretary Kerry when we met several weeks ago, because I think it is an imperative that we should carry forward. There are many things that are presented within the Arctic Council and, based on who is chairing at that time, that initiative either carries forward or it stops. I would suggest to you that this needs to be a priority that the United States carries forward from what Canada has built and that when we pass the gavel in two years that that will continue.

Again when we talk about the Arctic and recognizing the priorities that have been laid out in the proposal from the United States, climate is one aspect of what we're dealing with but an economy that allows for the people of the north to not only exist, but to thrive is critical. So I thank you for that clarification.

Admiral PAPP. Yes, Ma'am.

The CHAIRMAN. Let's turn to Senator Cantwell.

Senator CANTWELL. Thank you, Madam Chair.

Admiral Papp, I think I want to start with you on this question about investment and resources. I'm sure to some people this sounds like a lot of the infrastructure investment might cost a lot, but it just reminds me of a guy named Jefferson who sent two people named Lewis and Clark and said get out there and define this area for us. I'm sure it took, for a very young nation, a lot of focus to understand why we would be spending all those resources in the Pacific Northwest, but thank God we did. So I think the same question is here today. What's it going to take to get people to wake up, to make people realize that you have to have the resource investment?

As the U.S. takes over the Chairmanship of this Council, do you have a recommendation yet on infrastructure investments that we would need as part of a comprehensive Arctic strategy?

Admiral PAPP. I'll say this once so I don't have to go back to it. My job as the U.S. Special Representative is international diplomacy. The State Department doesn't have an impact directly on domestic issues and domestic resourcing; however, we have taken that into account in our program with a very heavy public diplomacy effort to raise the awareness of the Arctic to the extent that we can by having meetings in Alaska of our senior officials. We're

hopeful that we can bring the most senior levels of our government to Alaska for events and draw the attention to the American people to the needs that exist in the United States portion of the Arctic.

In terms of resourcing I've seen, as we all have, what's in the U.S. national strategy for the Arctic. We have the implementation plan which is very extensive, but there are about 22 or more agencies or departments that that impacts.

And that's why the President came out with the executive order which creates the Arctic Executive Steering Committee which just had its first meeting, and hopefully they're going to start and produce gaps and overlaps analysis on where we can begin to set priorities for resources that are needed in the Arctic.

What I would say, from my professional experience and having been working in Alaska for at least the last five years or so now directly observing what needs to go on there, the needs have been identified. There are plenty of needs up there that have been identified.

Senator CANTWELL. Like ice breakers.

Admiral PAPP. It's just—pardon me?

Senator CANTWELL. Like ice breakers.

Admiral PAPP. Ice breakers is one of them. You can trace the history of this country back to the Federalist Papers that talk about the need for maritime safety and security for prosperity of this country. Alaska's maritime is opening up. Their needs for maritime safety and security are huge.

I get accused as any, well, it's typical that a former Commandant on the Coast Guard would speak this way, but that's who I am and I think that's why I was hired.

And the maritime needs up there, in particular, charting was already mentioned. Many of the soundings up along the North Slope are from Cook's third voyage back in, I guess it was 1778. And I've confirmed this with the oceanographer of the Navy. Sounding is up there were from led lines in sailing ships.

But ice breakers, you know, we get wrapped around the axel talking about do we need six, do we need three and three, whatever it is. The fact of the matter is if you're talking three and three or four and two or whatever it might be then there's at least a need for one.

Senator CANTWELL. Yes.

Admiral PAPP. And we haven't even started on the one yet.

So there's plenty of needs that are already identified. We just need to get about the business of setting some priorities and having the determination to start resourcing them.

Senator CANTWELL. Thank you.

Dr. Bitz, what do we need to get a national scale, federal, robust Arctic research program going?

Dr. BITZ. Are you asking——

Senator CANTWELL. I hear that we're using information from Captain Cook's efforts as the real measurements that we've had in some of these areas, so what do we need to do to get the data and information, the need for which Mr. Arnold laid out in a very robust way? What's at stake in these new shipping lanes? We're going to have to have good data and information on the Arctic to provide people with accuracy.

Dr. BITZ. Right. We need——

Senator CANTWELL. And the Chairman mentioned a magic word here. I have my Coast Guard and fisheries staff person here and smart buoys would make anybody jump up and cheer, so the Chairman's mentioning of that is a particular area that all throughout the Pacific Northwest we're interested in.

Dr. BITZ. Right. We need sustained observing networks. We have limited numbers of buoys. These are very useful for prediction and for understanding. We utilize all that data, but it's just in localized regions. We have estimates of where we need observing stations and at this point we're limited, and we are under sourcing the number we could utilize.

The satellite networks are also of extreme value. Commitment to keeping what we have and improving the number that exists today is also critical for us. At this time what we absolutely have need for prediction of sea ice and sea ice thickness and type of sea ice. And we do not, in the U.S., have a sea ice thickness observing satellite at this time. We use a European satellite which is accurate, but we hope we could do better. It's not as good as we——

Senator CANTWELL. So the Europeans have better data on this than we do?

Dr. BITZ. Absolutely, but they share it with us so that's pretty good. And——

Senator CANTWELL. Well, all they did with Sandy, but we would have been better prepared for Sandy if the U.S. would have had the supercomputing data and forecasted that out even further and helped the local governments plan. Because once, as we all know in the Pacific Northwest, we know events are going to happen, the question is having the ability for local governments to plan for those events and getting the infrastructure and warning systems and everything in place so that we can respond quickly. Thank you.

I'm sorry. I know my time is expired.

The CHAIRMAN. Senator King.

Senator KING. Thank you, Madam Chair, and I have to tell a tale on you, Madam Chair, before I begin. I approached the Chair on the Floor of the U.S. Senate about a year ago and said I would like to be the Arctic Senator. The response was, "No, you can be the Assistant Arctic Senator." [Laughter.]

So those of you from Alaska, I want you to know that the hierarchy is very clearly established here. [Laughter.]

I also recently met with the Speaker of the Icelandic Parliament who left me a wonderful book, the Sayings of the Vikings, the eddic poems, a thousand years old, and I think apropos of our hearing today is the little poem, "Seeking Knowledge."

"The cautious guest who comes to the table speaks sparingly, listens with ears, learns with eyes, such is the seeker of knowledge." What a lovely thought for us to try to attempt to emulate here in the Congress.

Admiral Papp, a very specific question, your title is U.S. Special Representative to the Arctic. How big is your staff? How many people do you have in your office?

Admiral PAPP. It's a day-to-day proposition, Senator. Actually within my personal staff we have a total of four, including me, but my job is to coordinate across the State Department. When I start-

ed the job I thought this is a rather small staff and this is going to be very difficult, but the fact of the matter is there are people in all the regional and functional bureaus across the State Department that have some touch point for the Arctic.

So what Secretary Kerry has asked me to do is to coordinate across all of those. I deal with the Assistant Secretaries primarily for Europe and Eurasia, but also the Western Hemisphere because of Canada. They cover the countries of the region, but then whether it's economic development, politics, military, whatever, we have people who are matrixed together that literally, I've never been able to count them all, but literally there are dozens of people who work the Arctic issues. And then, of course, we work across the interagency as well. I have that latitude.

Senator KING. I understand that, but I would suggest that a staff of three in this situation does not represent a significant commitment by this country.

Second question. Practical limitations or practical disadvantages to the U.S. of not joining the Law of the Sea Treaty?

Admiral PAPP. Practical on a day-to-day basis, not a lot because——

Senator KING. But I'm talking about things like territorial claims and the adjudications. I understand by not being members we're out of that process.

Admiral PAPP. That's the biggest part of it. That's probably the largest impact is we cannot perfect a legitimate claim on Outer Continental Shelf. We can do the research. We can develop our claim which we are doing.

There have been, I think, six voyages over the last eight years or so to map out, at least in the Arctic, where we think our extended continental shelf claims are. But we don't have standing to be able to then go to the Continental Shelf Commission to lay our claim down and then have it validated and then go into negotiations with the bordering countries.

Senator KING. Meanwhile the other bordering countries, particularly Russia, are staking claims which are quite extensive.

Admiral PAPP. For the Arctic the big ones have been Russia, Canada is just about ready to go with its claim, and of course, Denmark got a lot of publicity recently by putting its rather large claim in including overlapping on the North Pole with Russia.

Senator KING. I'm running short on time. For the record I'd like you, if you could, to supply us with a list of legislative priorities. Things that we should be addressing. We don't need to go into that now, but if you can supply that after the hearing.

Admiral PAPP. Yes, sir.

Senator KING. Final question, talking about charting. The U.S. Navy is up there. I was on a Virginia-class submarine under the Arctic ice about a year ago. Are they providing data for charting? It strikes me as inefficient if we've got ships in the Arctic Ocean with amazing capabilities for measuring what the bottom looks like if we're not gathering that data to contribute to charts.

Admiral PAPP. Well, sir, as you know the discussions of where, how, what they are, and what numbers the Navy has up there would have to go into a classified session.

Senator KING. Well, my question is are we gathering data that's being contributed to the public realm for charting?

Admiral PAPP. They can, but the needs for charting are in the more shallow waters. Navy, with the type of assets they have up there stay in some rather deep water. I'm sure they gather information, but it cannot contribute to the type of data that we need which is coastal in the shallower waters where a lot of that maritime traffic is going to go.

Senator KING. Thank you very much.

Madam Chair, I'm out of time. Thank you for all of the very good testimony today. I appreciate it and I think the record should show you mentioned about witnesses flying from great distances. Our man from Maine came overnight on the train in order to get here to beat this weather here in Washington, so I wanted to express my appreciation to Mr. Arnold.

The CHAIRMAN. We appreciate that a great deal.

I just want to add before we go to Senator Hirono, talking about what might be available from the Navy and other opportunities to help us get better chart data. I think it should also be noted that when private industry goes out exploring they also need to be understanding what is happening on the bottom, and so there may be some private/public partnerships there that we can be talking about.

Senator Hirono.

Senator HIRONO. Thank you very much, Madam Chair, and I thank all of the panelists.

Madam Chair, I think those of us who are here should get a gold star for showing up. [Laughter.]

Yes, I think that's a good idea.

The CHAIRMAN. Yes, a golden nugget. [Laughter.]

Senator HIRONO. I'm very glad that Senator King asked Admiral Papp the question about the fact that the United States is really losing out in making our claims to the Outer Continental Shelf because we are not party to the UN Convention on the Law of the Sea, and we can fix this by joining this convention along with 167 or so other countries that are members, wouldn't you say?

Admiral PAPP. Yes, Senator. In my previous assignment I testified before the Foreign Relations Committee when Secretary Kerry was the Chairman. That was the last time that that had been brought forward in the Senate. In fact it was not just me. It was, I think, three other admirals and two generals that were on the panel.

I just think that, as a practical thing, every time, every international venue I go to the conversations with the United States starts out with a lecture on why have we not ceded to the Law of the Sea Treaty and shown leadership that I think it's now 186 other countries have signed onto it. And the countries that have not are ones that I would rather not have us associated with.

So yes, we comply with it, but there are limitations on what we can do, particularly for the Continental Shelf.

Senator HIRONO. I don't know why the Senate has not confirmed our membership, but I think it is high time because as we sit here talking about economic development issues in the Arctic area, it

doesn't make a lot of sense to me and I'm sure some of my colleagues that we are not party to that convention.

Admiral Papp, I would say there's probably and perhaps to the panelists here that in some ways it's ironic that global warming, climate change has opened up areas of the Arctic to further resource extraction of oil and gas. So can you talk about how you will fulfill the President's objectives to reduce U.S. greenhouse gas emissions and reach an international agreement to limit global emissions in light of the interest of the United States and other Arctic nations in developing the oil and natural gas deposits that will be opened as Arctic ice recedes?

Admiral PAPP. Well, Senator, I'm not going to be able to reduce those or make any progress on them. My job is to prepare us for the Arctic Council, but we're drawing attention to what climate change is doing, not only to the Arctic, but also to the rest of the world because of this change. We wouldn't be there if it were not for the change.

We do have black carbon and methane studies that have been going on through the Arctic Council. The reason the Arctic Council was started was for environmental protection and then creating sustainable development. Those are the key factors that have been a part of the Council since its existence.

So we will highlight those things over the course of our Chairmanship of the Arctic Council as other Departments take the efforts forward to the COP meeting in Paris, and as the President negotiates other agreements the Arctic will be highlighted so it shows the rapid change that's occurring with that environment and hopefully through our process and our elevations where public diplomacy for the Arctic Council will bring that to the attention of the American people.

Senator HIRONO. So you see the need for balance. Balancing our desire to reduce global warming, climate change and the desire for the economic activity in that area. So I think that that is really in heightened perspective in this area of the world.

I wanted to just ask, Madam Mayor, you know, Hawaii also has a native people, the native Hawaiians, so we are very aware of the need to involve the voice of the native peoples in any kind of discussion that would lead to development, economic sustainable communities, etcetera. You noted in your testimony that you did not think that our country has given sufficient voice to the native peoples of Alaska.

So in saying that do you speak for all of the Alaska tribes and other leaders in Alaska?

Ms. BROWER. Through the Chair, Senator Hirono, I want to thank you for that question.

I believe that this has been a discussion ever since President Obama had given his executive order that his first consultation would be directly with the tribes which had really sustained a lot of questions and concerns among, not only municipalities of which I serve but also the regional corporations, who are for-profit corporations, village corporations and all for-profit and non-for-profit corporations. And through that are all tribal members of which there are members in all capacities.

The whole issue I say is I represent the people that also belong to those entities in the region that I serve, and then when you go outside of my region which is the whole State of Alaska also represents the same.

In the instance that we've done in the last four years that we worked very hard in tribal consultation because we recognize that even speaking to our Department of Interior we have to have a tribe member with us. We have to have a person who belonged to a native village that is an IRA status. So when we realized that we needed their consultation, we went back and we decided that the best way that we can do this, to have all open communication, was to have tribal consultation, government-to-government consultation, meaning that we have to also include the before-profit corporations because they are serving the same tribal members.

So we created what we call Voice of the Arctic which includes all entities and all entities meaning that we have our village corporations, our regional corporations, those that serve in the native corporations, city governments, as well as the North Slope Borough. And we will have our first official meeting March 9 and 10, and we welcome anyone to come and listen.

In fact, entities such as the Bureau of Land Management will take an opportunity to discuss with the tribal leaders along with the regional leaders and the municipal governments in discussing issues that impact our region. I have great honors to the NANA regional corporation, the AMITA Corporation, all the native, tribal organizations from the North West Arctic Borough who has been here in discussing a lot of their region issues.

It's the same way when you come in numbers you don't come in numbers at times, but you do have a very well representation. And that, I believe, I do have that very strong trust in what we do because everything that we've done if we were to wait for the federal government and the State of Alaska to do our services in the very harshest region that we live in in the whole State of Alaska, we'd never get anything done. So we have to have trust from our tribal entities which are our tribal members. So, yes, I do come with that trust.

Senator HIRONO. Madam Chairman, my time is up, but I do commend Mayor Brower for doing everything she can to bring the various perspectives at the table so that voices are heard.

Thank you. Mahalo.

The CHAIRMAN. Thank you, Senator Hirono.

Senator Franken.

Senator FRANKEN. Thank you, Madam Chair, for having this hearing. By the way since both the Ambassador to Iceland and Ambassador from Iceland are here, my wife Frannie and my sister-in-law went to Iceland for about ten days a couple weeks ago and just loved the whole trip.

Let me ask Dr. Bitz, we're basically seeing this decline of Arctic sea ice, and that's what's making available these shipping lanes and possible additional areas to explore for oil and gas. This is the effect of climate change, right?

Dr. BITZ. I think at least a large portion of the decline is due to climate change, to human activity.

Senator FRANKEN. Right, and that a lot of climate change is due to the burning of fossil fuels, right?

Dr. BITZ. Yes.

Senator FRANKEN. Okay, so we have a bit of an ironic situation here, do we not? I think everyone sees that the burning of fossil fuels is creating an opportunity to find more fossil fuels to burn.

Dr. BITZ. It is obviously ironic, yes.

Senator FRANKEN. Yeah, that's funny how ironic it is. It's hilarious. So the state is melting to some degree. I mean, that's what's happening, right? Our Alaska friends? The coastal communities are obviously feeling it, and my understanding is this is a very expensive problem to fix when some of these coastal communities have to relocate. Is that right? I heard estimates of about $380,000 per person to relocate. Is that correct, Mayor? Is that about right?

Ms. BROWER. At a minimal of that cost.

Senator FRANKEN. Okay, okay. So this is also expensive. I just want to make it clear because very often my colleagues on the other side of the aisle do not recognize that climate change is happening, is caused by human beings, and that it has its costs.

Now it's creating some opportunities including shipping lanes and shipping lanes may be more efficient, actually, but it's also presenting some opportunities that ironically may actually, while they create economic opportunities, are also possibly exacerbating the situation.

Is that, Dr. Bitz, a good summary? Am I hitting this over the head too hard?

Dr. BITZ. I think that is true.

Senator FRANKEN. Okay, can you describe the various aspects of climate change that will be amplified by the rapid decline of sea ice? I mean, won't there be areas that now absorb more sunlight because, I mean, ice is white?

Dr. BITZ. Yes, that is the one driver of the amplification that occurs in the high latitudes that a retreat of a highly reflective surface in replacement of a very absorbing one amplifies the initial cause of warming.

Senator FRANKEN. What effect will that have on those who live in lower latitudes?

Dr. BITZ. Right, well this is an area of active debate in the climate community but the hypothesis is that it will cause larger extremes such as have occurred in the eastern coast of U.S. in the last two years with very harsh winters, so larger excursions in both warmer and cooler. So of course in my home state it was warmer than usual this winter. That's hard to even say winter because it was so warm.

Senator FRANKEN. Well, what state is that in?

Dr. BITZ. Washington.

Senator FRANKEN. Oh, the State of Washington. Well my time has run out, but I want to thank the Chair for this hearing.

The CHAIRMAN. Thank you, Senator Franken.

Senator Sanders.

Senator SANDERS. Thank you, Madam Chair, for this very interesting hearing. I want to pick up on a few of the points that Senator Franken made because I find this really fascinating.

The scientific community is virtually unanimous in telling us that climate change is real. Climate change is caused by human activity. Climate change is already causing devastating problems in the United States and around the world, and if we do not get our act together and significantly cut carbon emissions that problem will only become much worse in years to come.

That's what the scientific community virtually unanimously tells us. We need to cut carbon emissions. We have to transform our energy system away from fossil fuel.

I don't have a whole lot of time. I would like to start with Admiral Papp and just go down the line. Do you believe what the scientific community is saying about the need to transform our energy system away from fossil fuel? Admiral?

Admiral PAPP. Senator, that's a part of our program, and we have put renewable resource——

Senator SANDERS. Very briefly. I don't have a lot of time. Sorry, I don't have a lot of time. Yes, no, maybe?

Admiral PAPP. Yes, we should broaden out our sources for energy beyond fossil fuels, but the reality is we don't have to depend on them.

Senator SANDERS. Mr. Herron?

Mr. HERRON. Yes, Senator, in my community we use diesel. At remote location, ice bound, six months of the year.

Senator SANDERS. No, my question is do you agree with the scientific community that we need to transform our energy system away from fossil fuel?

Mr. HERRON. Yes, sir.

Senator SANDERS. Okay, I apologize, I just don't have a lot of time. Ms. McGuire?

Ms. MCGUIRE. I think that it will take longer to answer than I can give you just to answer.

Senator SANDERS. Okay, thank you. Mayor?

Ms. BROWER. Combination of both.

Senator SANDERS. Okay. Dr. Bitz?

Dr. BITZ. Yes, we need alternatives.

Senator SANDERS. Mr. Arnold?

Mr. ARNOLD. Yes, we should be mitigating alternatives.

Senator SANDERS. A report by the U.S. Army Corps of Engineers predicted that the highest point in the village of Newtok, Alaska, I hope I'm pronouncing that correctly, could be underwater by 2017. A proposed move to higher ground may cost as much as $130 million. A federal government report found more than 180 other native Alaskan villages or 86 percent of all native communities were at risk because of climate change.

In the case of Newtok, those effects were potentially life threatening. Dr. Bitz, is that a true statement?

Dr. BITZ. Yes, I think the permafrost thaw is a factor there as well as rising sea level and higher storm surge.

Senator SANDERS. I'd like to ask Ms. McGuire and Mayor Brower, it sounds to me and maybe I'm wrong, I'm not an expert on this, but it sounds to me like climate change is an absolute threat to the way of life of native Alaskans. Senator McGuire?

Ms. MCGUIRE. Through the Chair, Senator Sanders.

Senator SANDERS. Pardon me, we're not that formal. You can talk to me.

Ms. MCGUIRE. Through the Chair, Senator Sanders, Alaskans are some of the first climate refugees. We're right there at the forefront, and at the state legislative level we're dealing, already, with the costs of moving these villages. So you're absolutely right.

Senator SANDERS. Alright. So I'm going to get back to the irony, I think, that the Senator—he's a victim to irony. He made a fortune on irony, right? [Laughter.]

Senator FRANKEN. A small fortune. [Laughter.]

Senator SANDERS. It would seem to me and what I'm hearing from—and you come from an extraordinary state. I've only been there a little, a few days, but it is just an incredibly beautiful state, and I'm sure you're all proud of the beauty of your state. But it would seem to me if one is concerned about preserving your way of life that one must be a leader in the fight against climate change. I understand the economic implications of it, but how can we be talking about producing more oil which causes climate change which will be devastating to the communities of native Alaskans. That I don't quite understand.

Mayor Brower, do you want to help me out on that one briefly?

Ms. BROWER. I believe that this is a ten thousand year old question. We never question anything that comes to us. We live with what is coming before us.

Senator SANDERS. But this one——

Ms. BROWER. But, yes——

Senator SANDERS. But let me just ask you this. I don't have a whole lot of time. In all due respect, this is not a ten thousand year old question. Climate change has been significantly accelerated in recent years. The evidence is it's caused by human activity.

Ms. BROWER. It's because of the fossil fuels that's coming out, yes, due to climate change.

Senator SANDERS. Alright, but what about the point about you aren't or some of you at least, are in favor of more production of fossil fuel which is ultimately destroying the very communities that your people live in. That does not make a lot of sense to me, in all respect. What am I missing?

Ms. BROWER. Through the Chair. The ones that are being more impacted is my region because that is where the whole activity of oil, industry, resource, onshore and offshore. And we do have communities in our region that is going through a quite alarming rate of permafrost melting.

Senator SANDERS. And in some years from now may by underwater.

Ms. BROWER. And some years now the—some villages that already have been created were built on frozen lakes. So yes, it's a matter of technology today. If technology were to say that I shouldn't have had Point Lay built and that it was sinking at alarming rate then technology if we were to check, we would have found them a more safer place than it is.

Senator SANDERS. Thank you.

My time is expired, Madam Chair, but I think your state, your beautiful state, is almost a canary in the coal mine here. And well, I said what I said. Thank you very much.

The CHAIRMAN. Well, as you can see we can probably have extended discussion and debate, and I think it is an important part of what we are discussing today. I have taken the perspective and approach that economic development and opportunities for the people who live and work and raise their families there is not inconsistent with ensuring that we are good environmental stewards.

I think, Mayor Brower, you note it will be the technologies that will allow us to adapt. And this is the question that I want to present, probably to you, Mayor Brower, or perhaps to either one of our legislators. And that is the issue of revenue sharing.

Because it's been pointed out to several colleagues here that we face issues like erosion of the coastline. Because we're seeing sea ice further from the shore, allowing the waves to build up, we're seeing threats to our community.

The statistics that you have cited, Senator Sanders, we commissioned this report to do an assessment about the vulnerability of our communities, not only our coastal communities but some of our river systems and the threats that are present. It's been identified that it's not just Newtok. There are other communities such as Kivalina and Shishmaref that will need to be relocated.

I have been out to Newtok, and I have seen the efforts that they are making.

So many in this room are very well aware, Kivalina's biggest priority right now is an evacuation route off of their barrier island. They need a new school, but is the state going to invest the money for a new school when the community itself is threatened?

These are the things that we are weighing as a state right now, but the cost to do this, the cost to move Kivalina, a community of about 400 people, is somewhere between $100 and $120 million. How do you do that? How do you deal with the cost to build revetment in Unalakleet? How do you make sure that in Kotzebue when we've got the mayor of the North West Arctic Borough here, former Representative Joule, how do we ensure that their coastline, the erosion that they're seeing is not eroded to the point that it threatens that community? It does require resourcing.

Senator SANDERS. But——

The CHAIRMAN. This is the discussion and I want to ask the question because it actually is a question. A question to Mayor Brower and to our legislators here in terms of the imperative for revenue sharing as a source, not only to allow for adaptation and mitigation funds but also to deal with the other side of it, the opportunity side which is how are we going to build out a deep water port? How are we going to ensure, again, that we have whether it's navigational aids or communication aids in an area where we currently lack them?

There hasn't been much discussion about revenue sharing, and I think it's an important part of this discussion in this Committee, and then we'll have opportunity for further discussion from members.

So, Mayor Brower and then either one of our legislators.

Ms. BROWER. Thank you, through the Chair. Revenue sharing is one that we truly support, and we want to commend Senator Murkowski in leading that forum. We believe that revenue sharing, as we all know, the State of Alaska has done its revenue sharing. But

what we've not seen from the federal government is that issue. So we truly support revenue sharing because we believe in sharing of our resources.

The CHAIRMAN. Ms. McGuire?

Ms. MCGUIRE. Thank you, Madam Chair.

I just want to hold this up really quickly for Senator Hirono. We're going to make sure you guys get a golden patch basically with the North Star there from the Alaska Arctic Policy Commission for being here today.

Yes, revenue sharing. I meant to include that in our short remarks that that's one of the areas we feel, with the $4 billion in lease revenues the federal government has already taken in, that's one place, one pot of money. But another is that opportunity to take one third in revenue sharing as you know the Gulf States do.

And just to touch back on Senator Sanders, I think what we're asking for is the opportunity to continue to adapt. And so ten thousand years, as the Mayor has said, of our people adapting. What we don't want to do is have a situation right now where we're still reliant on fossil fuels. We're still going to be developing those.

Other countries will develop them if we don't and possibly more irresponsibly, so we're not going to supplant that. We're moving toward renewables. We're not there yet. It's a lot of money, a lot of technology that we don't have. So in the meantime, let's not hamstring the folks that live on the forefront of the very first effects of changing climate by not allowing them to have the resources to make their lives better. And part of that is an economy.

The CHAIRMAN. Ms. McGuire, I thank you for that.

Mr. HERRON. Senator?

The CHAIRMAN. Representative Herron?

Mr. HERRON. Excuse me. To the question of Senator Sanders about the irony of it is I represent Newtok. And I've been to Kivalina with the Chairwoman just recently. Newtok is not just about sea ice or lack of. It's not about storms. It's also about river erosion. It's also about permafrost melting. But when you talk about the irony, why should we drill for more, so we can use more fuel products. And that's what the other speakers have said. It's about having healthy, sustainable communities.

And so there is no irony to a person that lives in Newtok. Kivalina, for example, that barrier reef took many years to build. Now the climate has changed its mind, and it's going to take a few years to remove that barrier. But back to Newtok, there is no irony there. We need to develop our own resources so that we can have a healthy, sustainable community in Western Alaska.

The CHAIRMAN. My time is expired, and I know members have questions for a second round here.

Senator McGuire, you raised the issue of renewables, and one of the things that I'm looking forward to introducing my colleagues to is what Alaska is doing as the Arctic state to really be the front line leader in developing out our renewable alternatives so that we don't have communities that are reliant on diesel. We are the innovators when it comes to the energy microgrids, and it's pretty exciting.

Senator Cantwell.

Senator CANTWELL. Thank you, Madam Chair.

It's clear to me that we need to be in the Arctic regardless of whether we're focused on more resource exploration. To me, it's an area that's critically important to the United States.

But I do want to ask Admiral Papp, what do we know about oil on ice? You know, we had Commandant Zukunft testify before the Commerce Committee. I think it's been more than a year ago now because we were very concerned about tar sands oil in in the Pacific Northwest and the fact that we don't know how to clean up tar sands spills. He basically said, we don't have a very good plan for tar sand oil. So what do we know about oil on ice?

Admiral PAPP. There is not a lot of information, and I've discussed that with each one of the Nordic countries as I've gone there. Obviously because the Nordic areas had open water for thousands of years and they come close to the ice and they've done much more oil exploration within their portion of the Arctic.

Even they say they don't have a lot of experience in terms of how we react to a spill in the Arctic ice. What we're hopeful is through our leadership on the Arctic Council to exercise that marine oil spill preparedness and response agreement. An agreement is as good as the paper that it sits on.

What we need to do is start exercising that and bringing experts together and coming up with experimentation, identifying shortfalls in terms of response equipment. Inventorying what's available amongst the countries that surround the Arctic so that we can get a step ahead of what, inevitably, will happen. Someday there will be a spill of some sort whether it's from drilling or whether it's from a marine casualty. And I think we're behind the power curve in terms of being prepared for it. So we need to start moving forward.

Senator CANTWELL. Can you talk about the impacts of not being a signature to the Law of the Sea Treaty? Specifically I'm concerned right now about pirating of fish, everything from crab in the Bering Sea by the Russians to other losses in cod or pollock.

Admiral PAPP. I'm hard pressed to come up with how not signing, not being a signator to the Law of the Sea hurts us in terms of fisheries because everything is customary. International law is what is brought into the Law of the Sea agreement, and we comply with all that.

Really the primary area that we are at a disadvantage is the Outer Continental Shelf, particularly the extended Outer Continental Shelf, and we will not be able to perfect a claim that's recognized by other countries until we accede to the Law of the Sea Treaty. So it's the bottom rights, etcetera.

Senator CANTWELL. I think the question is we don't have enforcement authority. I'm sure what happens now when we find violations.

Admiral PAPP. No, Ma'am.

The fisheries that's in the water column is governed by your exclusive economic zone which we are all in agreement on. The extended Continental Shelf gives you rights for exploration on the bottom and in fact, even though we have these claims that are occurring there will still be international waters at the center of the Arctic. Even though there will be claims for the Continental Shelf, the waters themselves that are above the bottom remain inter-

national waters subject to any country around the world coming in and fishing.

So one of the important things, one of the reasons we are committed to keeping communications open with the Russians is because there are very vital things like the Arctic Council and fisheries agreements that we need to continue to work with the Russians on so that we don't harm that particular resource.

Senator CANTWELL. We are talking about Arctic fish here and this is part of the issue of whose fish, whose resource. So the question is how much patrolling are we doing in that area? How are we defining this? So you don't see this as a challenge? You don't see——

Admiral PAPP. It's going to——

Senator CANTWELL. Current resource allocation and enforcement as an issue?

Admiral PAPP. It's going to be a challenge. We already have science that's telling us that species are moving north from all the countries. I had a chance to meet with some Greenlanders recently that are catching species around Greenland that they've never seen before, and we have science that shows us that other species are moving up through the Bering Strait into the Arctic.

That's why we placed a moratorium on fishing within U.S. waters and have pretty good agreement with the other countries up there for a moratorium until science can show what the stocks are doing up there, and then we can do it based upon science.

We're also working towards an agreement so that that hole up at the center of the Arctic that is international waters, we seek to have an agreement whether it's a regional seas program or otherwise, that would prevent other countries from coming up there and harvesting resources that we are not sure of because we don't have the science yet.

Senator CANTWELL. Okay, thank you. I see that my time is expired.

The CHAIRMAN. Senator King.

Senator KING. Thank you, Madam Chair.

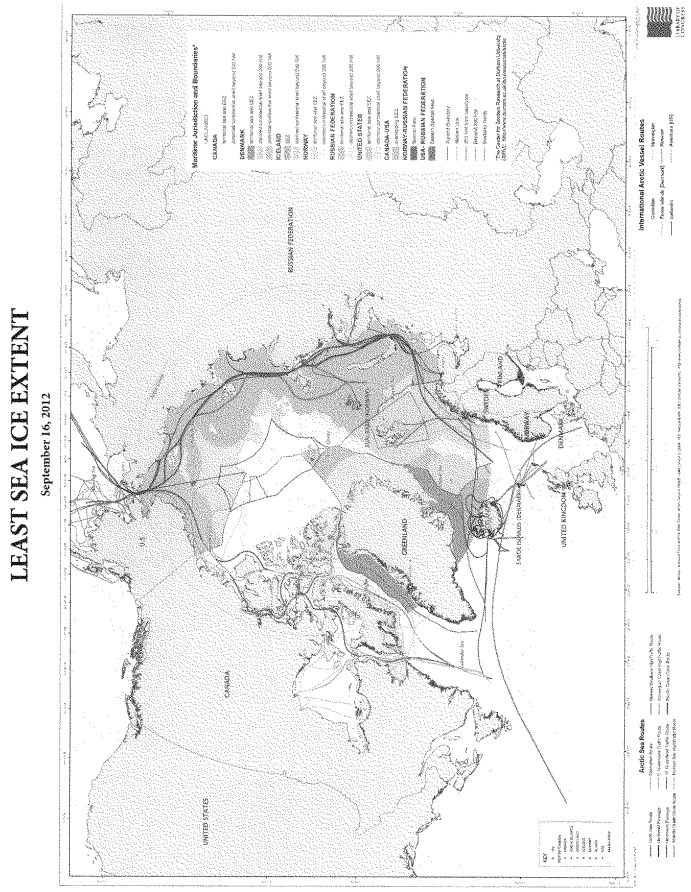
On that point, lobstermen in Maine, Admiral Papp, are now catching seahorses in their lobster traps which is astonishing in terms of species moving north.

A couple of points, Madam Chair, that I think might be helpful.

We've been talking about ice breakers. To me an ice breaker is a piece of infrastructure. It's like a highway, and on a back of the envelope calculation one new ice breaker is equivalent of about 100 miles of interstate highway. Putting that in perspective and the importance of these ice breakers, I think, is important in terms of our national expenditures on infrastructure. Of course, we're doing a pretty poor job on infrastructure generally, nationally, but we ought to be able to build the equivalent of 100 miles of interstate highway to provide access to this incredible new region.

The way I think of it is it's as if we have discovered the Mediterranean Sea. It's an entirely new body of water that has been essentially locked up for most of human history with neighbors, and hopefully we're going to be able to develop and work in this new place peacefully rather than have to go through centuries of war which surrounded the development of the Mediterranean Sea because we have the international organizations that we never had before.

I think one of the important data points on this is this chart of the Arctic and the principal sea route now is right along the Russian coast. [The information referred to follows:]



It's another reason that this has to be done. This route is useable in many cases today. This is the summer ice. The polar route will be many years. The Northwest Passage will come sooner than the polar route, but the principal route now is right along the Russian coast and that's something that we need to take into account. It's another reason that these international relationships have to be developed in a systematic and deliberate way that I think make this so important.

One final point and then I wanted to ask Mr. Arnold a question.

I would recommend to the Committee and to the witnesses and to our friends who are here today an animation prepared by NOAA, and you can find it if you go to You Tube and type in NOAA Arctic Ice Animation. You'll see the aged iced from 1987 to 2014, and what you see over time is it's contracting. It's very dramatic. It makes the point much more dramatically than any of us could make in a speech. I recommend that to you. I think it's so important.

It's another connection between Maine and the Arctic. We have two companies in Maine, Ocean Renewable Power and Pika Industries. Ocean Renewable Power actually has an experimental tidal facility in Alaska. Pika is doing microgrid work that I think would be very interesting because I'm sure, Madam Mayor, your energy, your electricity costs are probably above 70 cents a kilowatt hour. It's all imported diesel, and it's not very clean. So renewables, it seems to me, is a huge opportunity for you.

Mr. Arnold, you worked on port development around the world. You've been a navigator. Talk to me about the opportunities that are created by transit through the Arctic and when do you see that coming to fruition and what's the potential?

Mr. ARNOLD. Sure. So one thing to point out is that moving freight by water is the greenest form of transportation when it comes to carbon emissions and on a freight per ton mile. It's important to have that consideration where we're talking about trade and we're talking about the sea lanes over the Arctic.

Another element to that, Senator Franken had pointed out, was that a reduction in transit time is also a greener aspect to this in that if you're reducing the amount of distance from say, China or Japan or Korea and the United States eastern seaboard by anywhere from 20 to 50 percent, because that's the reduction that you would experience in the case of using either the northern sea route or northwestern passage then you're reducing the equivalent amount of fuel consumption to move that same freight which is going to move regardless of whether or not that sea route is open but your fuel consumption and emissions related will be 20 to 50 percent less as well.

So in regards to accessibility there are already more than 70 ships in 2013 that transited the northern sea route and that was with ice breaker assistance from Russia.

Senator KING. They charge more.

Mr. ARNOLD. They do charge for that. They're very cognizant of the opportunity that exists with charging every other country and every other ship owner for that. And there's a cost to it. So naturally they would charge for that.

Right now everyone that we're working with, Eimskip, the CEO of Eimskip is working very closely with the Chinese shipping company, Cosco. And we're really looking at, kind of, a gradual opening of the northern sea route for the summer months over the next five to ten years.

This is a very long term discussion, but it's the reason the investments in the ice breakers are happening now is because the moment you have that you're extending the fringe or the shoulder season for when you can transit that passage.

Senator KING. Thank you. Thank you, Madam Chair.

The CHAIRMAN. Thank you, Senator King.

We've been talking Arctic for about two hours and 15 minutes, and I just appreciate the indulgence not only of each of the panelists, but those who have come here to listen and to the members. Given that there are other things that are happening, the attention that has been given to this issue this morning is somewhat representative of the growing interest that so many have in the Arctic whether you are a resident of the Arctic or a wannabe. And we want to make sure that there are more wannabes.

I want to recognize before we conclude we have several other legislators that have joined us. I see Representative Millett from Anchorage in the back there. We had Senator Castello here earlier. We have former State Senator and President of our State Senate, Drue Pearce, in the back. Mayor Joule, who is the Mayor of the Northwest Arctic Borough, was also with us. Again, great representation out there.

I do want to make just a correction here because Senator King you noted that in so many parts of Alaska the energy costs are extraordinarily high. One of the amazing benefits that the community of Barrow has seen and several of the other communities in the North Slope Borough is that when the oil pipeline came on part of the agreement was that the communities would have natural gas. And so Barrow is blessed to have abundant sources of affordable natural gas.

Mayor, maybe you can tell me within your Borough, how many of your villages have natural gas accessible to them? So how many diesel communities do you have versus how many that enjoy the benefits that come with affordable natural gas?

Ms. BROWER. Through the Chair, Barrow is the first village through the transfer, the Barrow Gas Field Transfer Act, and then Nuiqsut which is one closest to Prudhoe Bay in formation of the Alpine, one of the agreements was that we would have a gas transmission line to that village.

All other villages are either through diesel, propane or gas and——

The CHAIRMAN. And Mayor, can you tell the Committee what folks are paying for their diesel or their gas right now in the North Slope Borough outside of Barrow and Nuiqsut?

Ms. BROWER. Propane about this high can cost you $800. A drum can cost you from $500–$800, and in Anaktuvuk Pass the gas to run either a snow machine or our services which we provide is as high as $10 a gallon for gas. I'm just giving you more recent examples, but the natural gas is the answer in natural heat and the emission out of the natural gas is probably less to any type of other

carbons that are out there. So we do have it, and it's just a matter of cost of trying to bring it to the communities.

The Transfer Act does allow for the natural gas to be transmitted to Atqasuk and Wainwright, but it's so cost prohibitive that we've not been able to do the natural gas transmission to those two villages.

The CHAIRMAN. Thank you, Mayor, for the explanation.

I had the opportunity a couple weeks ago——

Ms. BROWER. Oh, if I may?

The CHAIRMAN. Go ahead.

Ms. BROWER. One of the villages that is the most impacted that is not going to be able to ever see and enjoy the natural gas transmission is the village of Kaktovik which is right adjacent to the ANWR. And that is something that we have to work with and very hard in how we're to do it. If they can build Point Thomson which is adjacent to ANWR, we should be able to build a transmission of gas, natural gas, to that village, but today that's been designated a wilderness, not even a pipe can go through that.

Senator KING. You planted that question, Madam Chair.

The CHAIRMAN. I didn't plant that question. [Laughter.]

But I will tell you that I did see a picture of Kaktovik last week where literally the buildings were buried with snow from a blizzard, and the article that described the storm that Kaktovik had faced said that the dumpsters in the community were flying about the community. It was that tough out there.

It's hard when the only way to keep warm and keep the lights on is expensive diesel or propane or oil, so I appreciate you mentioning that.

I was going to conclude my comments by saying that the Mayor hosted me in Barrow a few weekends ago. It was actually Valentine's Day, and it was a gathering called Kivgiq which is the dance festival that is held about every three years or so where people from all of the North Slope villages come together for days of dance. We were there for the final day, and the grand finale was celebrated at about 2 a.m. with the most amazing drumming and dancing, a beautiful expression of the culture of beautiful people, truly the heart of the Arctic. And I was honored to be included as part of that.

But it's a constant reminder to me that as we face these challenges, as we face these opportunities in the Arctic, we not ever forget the people of the Arctic. So, thank you for your representation.

Thank you to my colleagues for being so attentive on these issues that, again, we're not talking about Alaskan earmarks when we're talking about an ice breaker. We're talking about national assets. And I appreciate the help of my colleagues.

And with that, we stand adjourned.

[Whereupon, at 12:21 p.m., the hearing was adjourned.]

APPENDIX MATERIAL SUBMITTED

U.S. Senate Committee on Energy and Natural Resources
March 5, 2015 Hearing: Arctic Opportunities

Responses from Admiral Robert J. Papp, Jr.
to Questions for the Record
Submitted by Senator Maria Cantwell

Question 1:

Ocean Data, Safety and Oil Spills

How critical are accurate weather forecasts to mariners? What is the minimum weather forecasting capability required for safe maritime operations in the Arctic?

- I am also concerned about how this lack of ocean and weather data will impact our oil spill preparedness in the Arctic. If there was a spill today in the Arctic, where would the ocean data used to model a spill come from?
- Speaking more generally, how would the United States respond to a major oil spill in the Arctic?
- How will you use your position on the Arctic Council to leverage international ocean observation data collection and sharing?
- Where the United States shares an international maritime border, we often have international oil spill agreements to ensure fast, coordinated and effective oil spill response. One of those agreements is the CANUSPAC in the Salish Sea. What types of international oil spill agreements exist between Arctic Nations? What gaps in response, research and spill response infrastructure currently exist?
- If there were a spill in another country's economic exclusive zone in the Arctic that posed a threat to U.S. waters or natural resources, would the United States have the authority to preemptively respond to that oil spill, today? Why or why not?

Answer:

I would refer you to the National Oceanic and Atmospheric Administration for responses to your questions concerning ocean and weather data.

- Generally speaking, we would employ a whole-of-government approach to respond to a major oil spill in the Arctic and we would work closely with the government of the State of Alaska. Each year the Executive Branch conducts a high level Spill of National Significance (SONS) Seminar to ensure that a whole-of-government

approach is available in responding to any major oil spill. While the SONS Seminar is jointly run by the Coast Guard and EPA, it includes participation from all relevant executive branch departments at the Deputy Assistant Secretary level and higher. Over the past three years, the SONS Seminar has focused on preparing responses to a major oil spill in the Arctic and has included participation from the Alaskan Department of Environmental Conservation. As a result of SONS multi-year Arctic focus, relevant agencies completed a tabletop exercise, developed lessons learned, and identified logistical hurdles and potential strategies to address the unique challenges presented. For the details on the SONS Seminar and work products, I would refer you to the Coast Guard.

- The United States has bilateral oil spill response agreements and arrangements with Russia and with Canada. We have also signed the multilateral Agreement on Cooperation on Marine Oil Pollution, Preparedness and Response in the Arctic, which will enter into force once the Arctic Council member States have each deposited a written notification. In addition, all eight Arctic Council member States are party to the global International Convention on Oil Pollution Preparedness, Response, and Co-operation, 1990. These bilateral and multilateral agreements establish a framework for notification and joint response in the event of an incident, as well as for preparedness, joint exercises, and other cooperation in advance of any incident. There are a number of other international agreements relating to oil pollution preparedness and response between the various Arctic states. Additional

information about many of these agreements may be found at http://www.arctic-council.org/eppr/completed-work/oil-and-gas-products/arctic-guide/.

- In the event of a spill in a foreign exclusive economic zone that threatens U.S. coastlines or related interests, the United States could use existing authorities to conduct response operations to the extent consistent with international law. Such authorities include, for example, the Federal Water Pollution Control Act (the Clean Water Act), in particular § 311, 33 U.S.C. § 1321(c); the Intervention on the High Seas Act, 33 U.S.C. § 1472; and general U.S. Coast Guard authority under 14 U.S.C. § 88 for the protection of life and property.

- I would refer you to the Coast Guard, the Bureau of Safety and Environmental Enforcement, and the Environmental Protection Agency for a current analysis of capabilities and gaps in response infrastructure.

Question 2:

Coast Guard Icebreakers and Infrastructure

As you know, many studies have outlined the need for more Polar icebreakers for transportation, safety, natural resource protection, maritime domain awareness and natural security. Though, many of these directives have been around since the 1980s. Why hasn't the Coast Guard been able to acquire the assets required to meet these mission requirements?

- Does the Coast Guard currently have operational icebreaking assets to support the Coast Guard's Arctic Strategy? What about the Coast Guard's expected increase in Arctic mission needs over the next 20 years?
- In your current role as the incoming head on the Arctic Council, do you have recommendations for a whole of government approach to Arctic assets and infrastructure including Polar Icebreakers?

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Answer:

I would refer you to the Coast Guard and the National Science Foundation for information on the U.S. icebreaking fleet.

Question 3:

Law of the Sea Treaty

The United States has not ratified the United Nations Convention on the Law of the Sea. Are you aware of any examples when not being a signatory to the Law of the Sea Treaty has damaged our national interests?

- What would be some specific negative impacts our nation would likely suffer if we continue to not sign onto the Law of the Sea Treaty?I have heard a few of my colleagues claim that signing onto the Law of the Sea Treaty would have negative impacts on nation's sovereignty. Please describe.
- United States and Canada have overlapping claims to the outer continental shelf beneath the Beaufort Sea. What is currently being done to resolve the boundary dispute in the Beaufort Sea?
- Are there negotiations with Canada underway? If not, why not?

Answer:

The significant national security, sovereignty, economic, and other interests of the United States as both a coastal state and a major maritime power are best advanced and secured by becoming a party to the Law of the Sea Convention. For example, to fully secure our sovereign rights to the vast resources of our continental shelf beyond 200 miles from shore we need to join the Convention. Likewise, to sponsor U.S. companies through the International Seabed Authority to mine the deep seabed for valuable metals and rare earth elements and give them the security of title to deep seabed mine sites needed to undertake the significant investments necessary for such mining, the U.S. needs to join the Convention.

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- Signing the law of the Sea Convention will not have any impact on national sovereignty. In fact, joining the Convention would help enlarge the area over which the United States claims sovereign rights. Some observers have called the Convention a "U.S. land grab," because it expands U.S. sovereign rights over extensive maritime territory and natural resources off our coasts. That is why the U.S. Chamber of Commerce, the American Petroleum Institute, and a broad range of business groups and companies have all publically supported U.S. accession to the Convention. Additionally, the Convention's provisions are highly favorable to U.S. national security interests because navigational rights and freedoms across the globe for our ships and aircraft are vital to our country and are the best means of maximizing and security the rights of our armed forces to move through and over the world's oceans. Joining the Convention would "lock in" those rights in a treaty rather than require us to rely on customary international law, which can be influenced over time because it is not codified and is ultimately something we cannot control.

Some opponents point to the International Seabed Authority, claiming that it will diminish U.S. sovereignty. This is simply not true.

  - The United States has never claimed sovereignty over any area addressed by the Seabed Authority. The Seabed Authority only implements the Convention's provisions on deep seabed mining in areas of the ocean floor that are beyond national jurisdiction.
  - The Seabed Authority has no role relating to non-seabed uses of the oceans, such as navigation and overflight.

  - In fact, as a Party, the U.S. would have an unprecedented ability to influence deep seabed mining activities worldwide. No other international organization gives one country, and one country only – the United States – a permanent membership on its key decision making body.

- We hope to resolve the maritime boundary with Canada in the Beaufort Sea and have previously held technical, bilateral discussions about it among government experts, with the idea of entering into negotiations at a later date. This boundary is extremely complex and would need to extend into areas of extended continental shelf, the geographic limits of which have not yet been defined.
- It seems unlikely that further boundary discussions will take place in the near term. Canada remains focused on its ongoing efforts to determine the outer limits of Canada's continental shelf in the Arctic.

Question 4:

Search and Rescue Capabilities in the Arctic

Are we prepared for a maritime casualty incident in the Arctic? What about a disabled passenger vessel? How long would it take for the Coast Guard to reach a disabled vessel?

- What are the U.S. Coast Guard's limitations to responding to a Search and Rescue incident in the Arctic?
- How does the U.S. contribute to the international Search and Rescue agreement? How much are we relying on other countries for search and rescue capabilities?
- In role as special envoy to the Arctic, how will you work to improve our search and rescue capabilities in the Arctic?
- In addition to investments in vessels and aircraft, what other tools does the United States need to improve safe transportation in the Arctic?

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Answer:

I would refer you to the Coast Guard for responses to your questions regarding that agency's capability for responding to a Search and Rescue incident in the Arctic.

Generally speaking however, the extent to which we are prepared for a maritime casualty incident in the Arctic depends greatly on the specifics of the incident in question, including the location of the incident, the extent to which that location is known with certainty to response personnel, the magnitude of the incident, the season in which the incident occurs, and other factors.

- Several international agreements facilitate international cooperation in Arctic search and rescue. The 1979 International Convention on Maritime Search and Rescue (SAR Convention) and Annex 12 to the 1944 Convention on International Civil Aviation (Chicago Convention) provided the foundation for development of an agreement among the eight Arctic States specific to Arctic search and rescue, the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic. This agreement identifies Search and Rescue Regions (SRR) where each country is responsible for coordinating search and rescue. In the Arctic, as around the rest of the globe, these SRRs extend into waters beyond national jurisdiction to ensure that vessels and aircraft in distress are covered by a response network, no matter their position. In the Arctic, as elsewhere, the responsible Rescue Coordination Centers will dispatch the nearest asset that is able to assist the vessel. A U.S. vessel may be dispatched to render assistance to a foreign vessel that is in distress, or a foreign vessel may be dispatched to render assistance to a U.S. vessel in distress.

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- In my role as Special Representative to the Arctic Region, I intend to work with our Arctic partners and appropriate U.S. government agencies to ensure that we conduct joint search and rescue exercises with other Arctic countries.

Question 5:

Polar Code

Without seasonal deep draft ports, or other infrastructure needed to conduct inspections and evaluations of vessels transiting the Arctic, how will the United States comply with the Polar Code and hold the vessels transiting the Arctic accountable?

- There are new international environmental regulations for operating vessels in the Arctic. Including restrictions for waste disposal and discharge of other toxic vessel waste. With no ports for vessels to discharge waste in the United States high Arctic, how will vessels be able to comply with these requirements?
- How will the Arctic Council contribute to the IMO discussions and the IMO decision making body regarding emissions, ship noise and energy efficiency requirements for vessels operating in the Arctic?
- Why hasn't the Polar Code adopted a ban on heavy fuel oil use while operating in the Arctic? Will the Arctic Council address this disparity?

Answer:

The International Maritime Organization's (IMO's) Polar Code was developed at the urging of the United States and other Arctic Council States. In 2009, the Arctic Council's working group on the Protection of the Arctic Marine Environment (PAME) published the Arctic Marine Shipping Assessment Report (AMSA). One of the primary recommendations of the 188-page AMSA was the development at IMO of Arctic specific regulations. That same year, the United States, Denmark, and Norway jointly submitted the first proposal for the Polar Code to the IMO. As the Polar Code was being developed between 2009 and 2015, the Arctic States frequently collaborated at the IMO to ensure

that the Polar Code was developed to best protect the safety of life and the marine environment in the Arctic. The strong working relationship between the Arctic Council and the IMO continues today. In fact, the Secretary General of the IMO was an invited guest to a meeting of the Senior Arctic Officials in Yellow Knife, Canada in 2014.

- As the Polar Code environmental regulations restrict discharge in Arctic waters, vessels transiting Arctic waters will be required to retain the restricted waste on board until they enter waters where they can resume their normal discharge operations in accordance with applicable international law, or until they pull into a port that has an adequate waste reception facility.
- As mentioned above, there is a strong working relationship between the Arctic Council and the IMO. Regular discussions occur on a host of issues, including emissions, ship noise and energy efficiency requirements for vessels operating in the Arctic.
- A ban on heavy fuel oil in the Arctic was considered as the IMO was developing the Polar Code. Ultimately however, there was not sufficient support from IMO member states to include such a ban. The Arctic Council continues to look at the heavy fuel oil issue through its working groups. Moreover, the Polar Code, like other IMO regulations, may be revised and amended over time. In short, while a ban on heavy fuel oil is not currently included in the Polar Code, such a ban may be considered in the future. We expect the Arctic States will continue to consult closely on any such discussions going forward.

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Responses from Dr. Bitz to Questions for the Record
Submitted by Senator Maria Cantwell

Arctic Research

Question 1: What types of ocean observation data do we currently have access to in the Arctic? What types of data and analysis are needed to fully understand, map and communicate changes in sea ice in the Arctic?

Observing the Arctic environment requires a suite of measurements due to the interconnected nature of the system. Sea ice is highly responsive to changes in the ocean and atmosphere, while it also amplifies changes across all components. Hence, sea ice, ocean, and atmosphere need to be observed simultaneously to understand processes that control Arctic change.

Arctic observing systems need infrastructure in the Arctic to collect, store, and deliver data to users. Infrastructure and a skilled workforce are needed at research institutions to analyze and interpret the data, produce data products, and store the data.

The Arctic is observed by instruments on satellites and in the field (known as *in situ*). Satellite measurements offer a whole-Arctic perspective and are important for understanding the range of Arctic change and dynamical interactions that occur on the scale of many miles. Unfortunately few satellites are able to provide measurements of the Arctic Ocean owing to the presence of sea ice. Hence, *in situ* observations are necessary for nearly every variable in the ocean. At the same time many traditional *in situ* observing methods are difficult or impossible in the presence of sea ice (see Figure 1). While new methods are making remote observations easier, intensive field campaigns of the sea ice, ocean, and atmosphere are still key to understanding the local processes that cause climate change and to validating satellite measurements.

Satellite and *in situ* measurements are indispensable to developing Earth System Models and evaluating their behavior. In turn, such models deepen our understanding of the past and allow us to make projections of future change to improve decision-making about our future.

Sea ice is a composite of ice floes that are separated by open water. A sea ice covered region is described by the fraction of the area (or concentration) that is covered by ice floes. The sea ice concentration is observed through clouds and both day and night at present by two satellites: (i) the Special Sensor Microwave Imager (SSM/I) satellites from NASA and (ii) the Advanced Microwave Scanning Radiometer (AMSR-2) from the Japan Aerospace Exploration Agency. These same satellites also distinguish multiyear ice (floes that first grew over open water more than a year ago) from first-year ice. These

data are among the most valuable in part because measurements are available since 1979, and thus provide the longest continuous record of sea ice in the whole-Arctic.

Sea ice thickness is a vitally important variable for prediction and monitoring sea ice change. Sea ice thickness strongly influences the sea ice conditions in summer, with unusually thin ice in spring leading to more open water in summer. Further, sea ice thickness anomalies tend to persist for a few months to a few years. Thickness is less well observed than concentration. A patchwork of *in situ* thickness measurements is available since the late 1950s from a range of methods, including submarines, buoys, and stake measurements made by hand. Satellites have been used to measure thickness in the last two decades. In orbit at present is CryoSat-2, operated the European Space Agency, with sea ice thickness measurements available about a month after the data are sent back to Earth. The accuracy of the measurements relies on the accuracy of snow depth measurements of the snow that lies on top of the sea ice, but measurements of snow depths are incomplete at this time. At present, a U.S. satellite that can measure sea ice thickness is planned for 2017. It will be NASA's second generation Ice Cloud and Land Elevation Satellite (ICESat2). In the meantime, NASA's IceBridge aircraft mission is making sea ice thickness and snow depth measurements on flight tracks for a few weeks in spring each year. These data are prized because of their accuracy, and they offer a rare survey of snow depths and sea ice thickness simultaneously.

The Gravity Recovery and Climate Experiment (GRACE) is a satellite operated by NASA that can be used to interpret changes in the mass of the ocean. It has been used successfully in the Arctic to aid in measuring seawater properties that vary with changes in ocean circulation and runoff from land.

Aside from GRACE, ice breaking ships and buoys have been the primary sources of ocean measurements in the Arctic. New technologies are permitting remotely operated or self-operated vehicles, such as sea gliders, to be programmed to make profiles under the sea ice and to pop up periodically in brief windows of open water to send data by satellite phone. These instruments can make measurements for weeks before returning to have their batteries refreshed. Sea gliders can measure temperature, salinity and seawater chemistry, thereby allowing measurements of conditions important for ecosystem studies as well as physical changes. Sensors attached to seals are another efficient means of measuring seawater properties in regions important to fish and seals.

Question 2: Understanding Arctic sea ice is important for a number of reasons, including safe transportation. What types of data and analysis does the United States need to have the capacity to deliver real-time information on ice cover, flow and thickness?

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Producing sea ice forecasts is a promising new activity that research scientists and operational forecast centers have taken-on since 2008. Weather forecasting has about a four-decade lead on sea ice forecasting. In theory skilful sea ice forecasts are possible a few weeks to a few years in advance. At this time, a few basic quantities have been evaluated, such as whole-Arctic sea ice areal coverage, to provide a metric of Arctic-wide sea ice conditions. However, local quantities and higher-level properties would be more useful to forecast, in order to identify optimal shipping routes or warn coastal communities of impending danger. These quantities include sea ice thickness, orientation of openings between sea ice floes, amount of meltwater ponding on the surface, and where sea ice is broken and piled up.

Sea ice is very sensitive to atmospheric and oceanic conditions, so sea ice prediction systems must simultaneously forecast the ocean and atmosphere. Earth System Models are an appropriate tool. Prediction systems will likely need observational data assimilated in all physical components at once, and many ensemble members (possible instances to produce probabilistic information) will likely be needed. Software and computing resources do not yet exist to meet these needs.

Many of the same observations that are valuable for understanding and recording Arctic sea ice change also benefit sea ice prediction. However, generally finer spatial resolution of sea ice conditions and ocean heat content will permit better forecasts. Ocean heat content near the sea ice edge in summer is most important for predicting the sea ice during fall freeze-up. Further, observations need to be available rapidly and reliably. The infrastructures to gather data in the field need to include methods to collect and transmit the data to research institutions rapidly.

The greatest need at this time is for sea ice thickness with better accuracy than the CryoSat-2 satellite offers today. Further, if thickness measurements were available in a week, rather than a month, sea ice forecasts 2-4 weeks in advance would be possible, and this is the range when forecast skill is expected to be greatest. Further, data need to be available year round, so forecasts can be made year round.

The planned NASA ICESat2 mission should, in theory, produce more accurate measurements than those from the current CryoSat-2 satellite. However, the accuracy of snow depth estimates influences the accuracy of sea ice thickness data from satellite. At this time, no satellite produces satisfactory measurements of snow on all sea ice types. The current NASA IceBridge aircraft mission is giving the first accurate across Arctic view of snow depths on sea ice. However, the flight tracks are still limited to the North-American sector, about 1/4 of the Arctic Ocean, each year, and flights only take place for a few weeks in spring. The mission was conceived to provide ice thickness data that "bridge" the gap between ICESat and ICESat2. However, the sea ice thickness measured by ICESat2 will be more accurate with continued snow depth measurements from IceBridge. The IceBridge mission needs to be the IceSustained mission. Flights are

needed over a larger region and for a longer period each spring. Continued sea ice thickness measurements from IceBridge also provide a valuable confirmation of satellite measurements.

Question 3: Ocean observation data is also used in weather forecasting and prediction, though we have significantly less Arctic data compared to other areas. How accurate are our weather forecasts in the Arctic? How is weather supposed to change over time in the Arctic?

The Arctic is one of the most sparsely observed parts of the globe for weather forecasting purposes. Weather balloons launch sites are sparse in the Arctic compared to in mid latitudes, and no weather radar exists anywhere north of 65N in North America. Buoys resting on the sea ice provide essential routine measurements of surface pressure and temperature, but only at the surface. Most other observations that inform weather forecasts are from satellites, and many weather satellites are geostationary (perched above the same point on the equator), with a poor view of the Arctic. Further, satellites observations of temperature and humidity structure of the atmosphere are made difficult by the very cloudy nature of the Arctic. Ships on Arctic research voyages often take special observations that are sometimes transmitted to the weather services. A study of the great Arctic cyclone in August 2012 proved that observations from even one ship considerably improved the prediction (Yamazaki et al, 2015). Dropsonde measurements from US scientists from US Coast Guard aircraft in the Beaufort Sea provide such measurements during the summer but only at intermittent intervals.

The consistent availability of sea surface temperatures and sea ice thickness is severely limited in the Arctic and the quality of those measurements is still in question. Yet studies show that both variables are important predictors of the atmosphere surface conditions. Sea surface temperature can be measured from satellite, but only where the ocean is free of sea ice. Conventional *in situ* measurements of sea surface temperature are rarely used when sea ice encroachment may be eminent (see Figure 1). Sea ice thickness in weather prediction systems is usually prescribed to be an average of previous years because thickness measurements are not available in time to make weather forecasts.

Weather in the Arctic is highly dependent on wind direction (Jung and Leutbecher, 2007). Projections from global climate models indicate that the storm track will shift northward, with a significant influence on the frequency and strength of high latitude storms, including the likelihood of extreme wind events in parts of the Arctic. The combination of an Arctic Ocean with more frequent open water and extreme winds is a serious issue for higher waves and coastal erosion. Arctic storms tend to be strongest in the fall, precisely when diminished sea ice has the greatest impact on the Arctic atmosphere. Greater open water coverage cause a warmer and moister atmosphere, which

can strengthen storms and increase storm frequency. The Bering Sea Storm of November 2014 had the lowest surface pressure in the North Pacific for the past 45 years. This storm had an extreme drop in pressure once it entered the high northern latitudes, suggesting the local conditions were a major factor in deepening the storm.

Global warming is expected to increase precipitation in the Arctic. Local Arctic warming increases the likelihood that precipitation will fall as rain, increasing the frequency of freezing rain and rain on snow events, both of which inhibit transportation and injure wildlife.

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Yamazaki, A., J. Inoue, K. Dethloff, M. Maturilli, and G. König-Langlo (2015) Impact of radiosonde observations on forecasting summertime Arctic cyclone formation. Journal of Geophysical Research, doi:10.1002/2014/JD022925.

Question 4: How does changing ice cover impact larger weather patterns, including patters impacting the lower 48 states?

Greater surface warming in the Arctic relative to the globe – known as Arctic amplification – decreases the pole to equator temperature differences over mid latitude regions, like the lower 48 states. The strength of winds in the jet stream derives from north-south temperature difference throughout the atmosphere, so Arctic amplification in a warming world may weaken the jet stream. However, a thinner and less extensive sea ice cover causes warming that is mostly surface trapped. Warming above the surface in the Arctic has been associated more with remote surface warming (Screen et al, 2012; Perlwitz, 2014). Some scientists have connected a warming Arctic with a slowing of the mid latitude jet stream and greater excursions in atmospheric waves (e.g., Francis and Vavrus, 2012). Arctic amplification is highest in fall and winter when storminess is normally the highest. The long-lived meteorological conditions observed across the lower 48 states in the last two winters, colder than normal in the east and warmer than normal in the west, resemble the proposed pattern.

However, there are many other factors that affect the jet stream and storm track besides the north-south temperature difference. For example, a consistent northward shift in the storm track is seen due to greenhouse warming, which should also shift the jet stream northward (Yin, 2005).

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Researchers are vigorously analyzing observations and conducting modeling studies to investigate polar-mid latitude weather and climate linkages. We are limited by the shortage of observations in the Arctic, especially in the past. Nonetheless, there are well-established theoretical and observed impacts of the Arctic climate on the mid latitude atmosphere and ocean. The connection between Arctic warming and changes in the mid latitude is still debated (e.g., see Barnes and Screen, 2015).

A workshop was held in September 2013 by the National Academy of Sciences to review the current understanding of Arctic-mid latitude weather and climate linkages and made recommendations to move forward to close important knowledge gaps. A report is available at http://www.nap.edu/catalog/18727. A follow-on international workshop was held in December 2014 by the Polar Prediction Program and the Polar Climate Predictability Initiative. A series of documents about the workshop is available at http://www.polarprediction.net/linkages.html

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Screen, J.A., C. Deser, and I. Simmonds, 2012: Local and remote controls on observed Arctic warming. Geophys. Res. Lett., 39, L10709

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Question 5: Please describe how the University of Washington is using an interdisciplinary approach in their Arctic program. What has the University of Washington learned that could be applied on a national scale as the United States builds a more robust federal Arctic research program?

In 2013, nearly 100 scholars in three vibrant centers of polar study and across many parts of the University Washington combined forces to create the UW Future of Ice Initiative, to further leverage and cross-fertilize existing disciplinary and interdisciplinary strengths on polar studies. The goal of the initiative is to train a new generation of polar scholars and citizens and to invest in new research that answer scientifically and societally relevant questions demanding the integration of a broad range of disciplines, from physics to biology to people and policy. With unprecedented levels of interest in the changing Arctic region, the stakes are high for those who claim, protect, and use the

region. The Future of Ice Initiative is our effort to apply our expertise collectively to these and related issues.

The UW has a long history of interdisciplinary research in the Arctic and Antarctic. For the past 45 years, the UW Quaternary Research Center has engaged in the study of polar glaciology, geomorphology, permafrost, climate change, ecosystem dynamics, and human-environmental interactions from the past to the present. For over 40 years, the UW Polar Science Center has maintained leadership in areas of Arctic and Antarctic coupled atmosphere-ocean-ice-ecosystem dynamics. For decades, the Canadian, Russian and East European, and European Studies Centers within the UW Jackson School for International Studies (JSIS) has focused on the social science, humanities, and policies of the Arctic regions and nations. Scholars in other corners of the University have been engaged in the study of Arctic law, public health, fisheries management, forestry, engineering and related subjects.

In a year and a half, the Future of Ice Initiative has made several significant steps towards achieving our goals. We founded the Arctic Minor—a program giving undergraduate students a broad background in Arctic social and natural sciences. A related pilot program for graduate students last year led to several published papers combining research in the natural and social sciences. We are hiring interdisciplinary-oriented faculty to strengthen the connections between disciplinary departments and expand university research teams' abilities to study such issues as the resilience of arctic ecosystems and people to climate change, resource extraction, and transportation. In those areas where we still lack local expertise, we are recruiting visitors though the Arctic Fulbright chairmanship (housed in the Canadian Studies Center and in its second year) and by hosting conferences and workshops that bring the national and international expertise to the UW campus to help us explore a broader range of issues (e.g., the Arctic Encounter policy and law symposium in January 2015; the Ecosystem Studies of Subarctic Seas conference in June 2015). Students educated in the undergraduate Arctic Minor and through our graduate programs will gain degrees and enter the workforce knowledgeable about and prepared to contribute their creative talents to polar issues, ensuring the best possible future for the polar regions and the most equitable and sustainable policies for those invested in the burgeoning opportunities and risks of the future.

Our collective experience working in and on issues of Arctic scholarship can be applied on a national scale, as the United States builds a more robust federal Arctic research program with regard to the following points:

- Understanding the interconnected Arctic system requires a focus on the inter-relations among physical, biological, and social processes. Programs with a narrow

research scope or expertise lead to disciplinary research that is insufficient to address questions about the relationships among climate change, ecological responses, human use of the environment, and the social dynamics at scales from families to international economics and politics. Managing for sustainability and adaptation requires research that can cross traditional boundaries of disciplines, cultures, spatial and temporal scales.

- At UW we have been successful in reducing the barriers to collaboration and integration, in part because our scholars are free to pursue research beyond the bounds of specific disciplines or narrowly drawn mandates. Centers and initiatives that bridge disciplines are effective ways to bring scholars together with expertise to tackle complex problems.
- Because the Arctic is a remote and expensive place to work for the majority of researchers, it is critical to coordinate projects that make the most efficient use of resources by bringing interdisciplinary teams into the field to study different dimensions of the interconnected systems we seek to understand. By working together we can solve more complex problems, minimize the logistical and ecological footprint of our work, and reduce costs. By collaborating with research partners in Arctic communities we can gain access to year round data collection, tap into local expertise, and build mutually reinforcing relationships with northern residents, many with decades of local knowledge and some inheriting generations of traditional knowledge.
- We need to balance field and remote data collection. Some remote observations are now easier, and monitoring technologies such as bouys drifting on top of sea ice, animal borne instruments, remotely operated or self-operated ocean gliders and aircraft, are becoming increasingly viable sources for some kinds of information previously unimaginable (e.g., variability of clouds and sea ice over the Arctic Ocean, three-dimensional ocean temperature and chemistry profiles, life histories of fish, polar bear migration patterns, narwhal diving behaviors). Some of these approaches require large coordinated initiatives at the national and international levels (e.g., satellite based platforms). Others are being developed locally and at increasingly efficient costs (animal tags and ocean gliders).
- Indigenous communities in the Arctic have a long history of sustainable adaptation in the Arctic. Yet, the last 150 years have been hard on these communities as they have been displaced from traditional territories and subjected to exploitative practices and policies. Establishing more secure and healthy futures for these communities in the context of environmental change and the burgeoning pressures of industrial development requires a reversal of historical tendencies to ignore the input and insights of these communities. At UW, we are trying to move away from colonialist legacies of research in which Southern scientists parachute into the Arctic

with research questions and methods that are of little interest to northerners. We strive to avoid seeing our research conclusions used in support of policies that actively undermine the sustainability of Arctic communities. Instead, we are embracing collaborative approaches and seeking to increase the numbers of Arctic residents that we enroll at UW. By recognizing community voices, expertise, and sensitivities, we hope to be able to provide more balanced understandings of the challenges faced in the Arctic and offer possible solutions.

Question 6: How do you see research institutions, like the University of Washington, playing a role in the emerging Arctic? How can the United States best leverage research with the academic and private sector as we increase research focus on the Arctic?

A central role of Universities is in the emerging Arctic is to generate ideas, understanding, and technology that will enable government agencies, NGOs and the private sector to effectively protect and manage the increasing access to this region. University researchers are findings ways to predict the complex interactions of the environment and human activity.

One of the most effective ways universities can take a lead in Arctic research is to facilitate and coordinate inter-disciplinary and multi-institution collaborations (at state, national, and international scales). Universities can provide the intellectual and structural flexibility and leadership to connect and integrate studies that bridge disciplines, agencies, industries, and governments.

A close interaction of scientists with industries and government entities that depend on scientific information is important in the formulation of research questions that have socio-economic impact and to disseminate the results. Centers that can establish and guide dialogue with users need to be integrated with research programs. Universities can house these centers and provide scholars with diverse knowledge of the relevant physical, economic, social, and geopolitical issues to undertake this dialogue. In turn, users would be more aware of what researchers could offer and would be more apt to form partnerships to take on the significant challenges and opportunities in the Arctic.

Research in the Arctic is critical to tracking, understanding, and managing change in the Arctic. The training of researchers working in the polar regions has lagged behind other regions of the world. The federal government should invest in universities around the country to facilitate the training of the next generation of citizens and scholars who can tackle the important problems that are only now coming into focus.

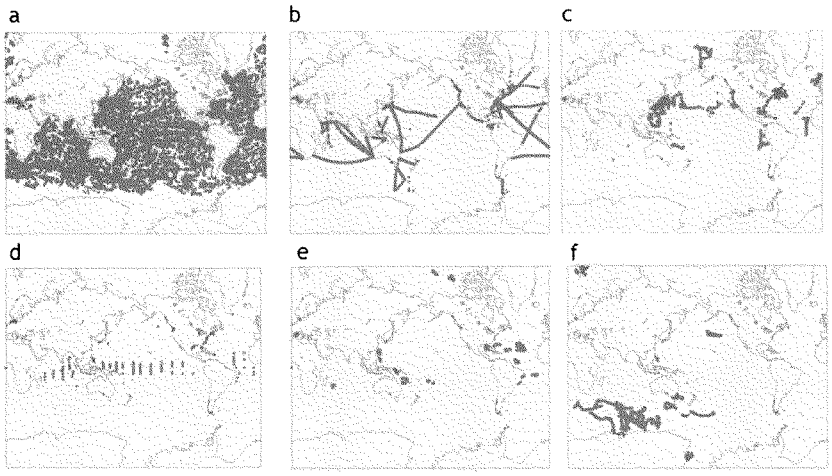


Figure 1. Ocean data coverage for September through November in 2012 from (a) Argo floats, (b) Expendable Bathythermographs (XBTs), (c) sondes (CTDs) and ocean gliders, (d) fixed buoys, (e) drifting buoys, (f) animal borne sensors. Figure from a white paper by the Polar Prediction Project by Fairall et al. (2013).

March 4, 2015

US Senate Committee on Energy and Natural Resources
304 Dirksen Senate Building
Washington, DC 20510

Dear Committee Members,

We write this letter as written testimony for the upcoming hearing on "Arctic Opportunities". As Alaska Native women, we have a vested interest in the present and future issues facing us in the Arctic. We are not made aware of hearings such as these often until last minute without enough notice for us to travel away from our homes and families and in this manner, our voices, historically marginalized, continue to be left out of the dialogue.

It was only last month that a closed door meeting took place at the Alaska Federation of Natives Winter Retreat in Kotzebue where a diversity of voices were heard on issues such as the Arctic National Wildlife Refuge (ANWR) including the voice of many tribes supporting the Wilderness recommendation for the Coastal Plain of ANWR. Following this meeting, Senator Murkowski, Chair of your committee, reported to the press that all Alaska Natives are aligned on wanting oil development on the Coastal Plain of the Arctic National Wildlife Refuge. This is not true. Even the Alaska Arctic Policy Commission has called the Wilderness designation regarding ANWR and blocking of drilling in areas of the Chukchi and Beaufort Seas, 'an assault on Alaska' by the president. We need the Committee to understand that many of us applaud these actions by the Obama Administration.

To be clear, there are many Alaskans that hold grave concerns about the negative impacts of climate change on our state as we are one of the fastest warming places on Earth and strongly believe we need to protect biologically sensitive areas such as the Coastal Plain and offshore areas in the Arctic from oil development.

We feed our families off what the rich land and seas of our Ancestors provides us with; moose, salmon, seal, whale, caribou, etc. The hunting and gathering of our native foods ensures that our cultural practices and spiritual beliefs stay intact for our future generations. Many of our communities would not be able to sustain our Native way of life without access to healthy fisheries, marine and land animals. This is something our elders, through thousands of years of traditional ecological knowledge, understood and is why we continue to work towards protection of these ecosystems. The dollar will only take us so far, but there is no replacement for our Native foods or the pure value of nature.

We need to work together to mitigate the effects of climate change and address the complex and often, too rigid, dual state and federal management system as it impedes our ability as Alaska Native people to adapt to the shifting of seasons that is taking place and is often resulting in food insecurity.

As we look for opportunities for economic development we should consider the option for a more compassionate and diverse economy and one that does not come at the expense of irreparable damage to crucial ecosystems and Indigenous ways of life. "Arctic Opportunities" must include, acknowledge, and be respectful of a diversity of voices, and the voice of Alaska Native tribal communities have much to contribute to this dialogue.

With gratitude and respect for the decisions you make on behalf of our country,

Anna Davidson (Yupik)
Akiachak, Alaska

Lily Hank Tuzroyluke
Native Village of Point Hope
Point Hope, Alaska

Jennifer Hanlon
Yakutat Tlingit Tribe
Yakutat, Alaska

Rhonda Pitka (Koyukon)
Native Village of Beaver
Beaver, Alaska

Debra Naaqtuuq Dommek (Inupiaq)
Kotzebue, Alaska

Faith Gemmill-Fredson (Neet'saii Gwich'in)
Native Village of Venetie Tribal Government
Arctic Village, Alaska

Alannah Hurley (Yupik)
Saguyak-Clarks Point, Alaska

Allison Akootchook Warden (Inupiaq)
Kaktovik, Alaska

Holly Edwards (Koyukon)
Holly Cross, Alaska

Rosemary Ahtuangaruak (Inupiat)
Barrow, Alaska

Princess Daazhraii Lucaj (Neet'saii Gwich'in)
Native Village of Venetie Tribal Government
Arctic Village, Alaska

Jody Potts (Han Gwich'in)
Eagle, Alaska

Victoria Hykes Steere (Inupiaq)
Unalakleet, Alaska

Maureen Johnson (Koyukon)
Holly Cross, Alaska

Dionne Norris (Unanagan)
Atka/Attu, Alaska

Melanie Brown
Naknek Native Village Council
Naknek, Alaska

Anna Hoover
Egigik, Alaska

Apayo Moore (Yupik)
Dillingham, Alaska

Skye Malemute (Koyukon)
Koyukuk, Alaska

Lise Rene' Wade
Ahtna Hwt'aene' from Nay'dini'aa Na' Kayax (Chickaloon Native Village)
Moose Creek, Alaska

Mae R. Hank
Tribal member of Inupiat community of the Arctic Slope
Point Hope, Alaska

Vi Waghiyi
Native Village of Savoonga Tribal member
Savoonga, St.Lawrence Island

Doreen Nutaaq Simmonds (Inupiaq)
Barrow, Alaska

Bernadette Horace (Gwichyaa Zhee Gwich'in)
Fort Yukon, Alaska

Carol Murphrey
Native Village of Barrow
Atqasuk, Alaska

Charlene Stern(Gwich'in)
Native Village of Venetie Tribal Government
Arctic Village, Alaska

Christina Edwin
Koyukok, Alaska

Lydia Olympic
Igiugig Tribal Council
Igiugig, Alaska

Misty Nikoli (Koyukon)
Kaltag, Alaska

Rosalie Kalistook (Yupik)
Chefornak, Alaska

Adrienne Edwards (Koyukon)
Holly Cross, Alaska

Polly "Napiryuk" Andrews, Cup'ik
Qissunamiut Tribe
Chevak, Alaska

Center for American Progress

Icebreakers: Essential Assets for a Changing Arctic

By Shiva Polefka March 5, 2015

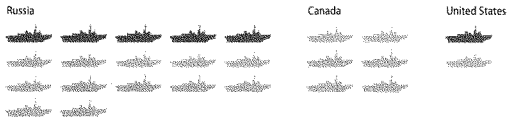
For most of U.S. history, the Arctic Ocean's frozen surface and hostile climate excluded most human activity from the region, outside of intrepid explorers trekking over the ice and stealthy naval submarines prowling beneath it. This extensive, year-round shield of ice protected the ocean and its ecosystems from commercial extraction of the region's living and mineral resources, and precluded any need for regular U.S. Coast Guard patrols beyond scientific research.

But times—and the Arctic's climate—have changed. Carbon pollution has resulted in the warming of the Alaskan Arctic at a rate twice as fast as the rest of the United States,[1] thinning the polar ice cap and shrinking the extent of the Artic Ocean's perennial sea ice by 13 percent per decade since 1978.[2] In other words, the gates to the Arctic are opening to shippers eager to shorten traditional intercontinental trade routes; oil corporations keen to tap one of the planet's last great fossil fuel reservoirs;[3] and international fishing interests, which have demonstrated aptitude for both legal[4] and illegal[5] harvests, even in high-latitude seas. According to Coast Guard personnel, traffic of all vessels navigating into and through the Arctic via the Bering Strait has doubled since 1998.[6]

Managing this expanding maritime activity—and ensuring that the Arctic's mariners and marine environment are protected—will require a greater presence in the polar ocean than the Coast Guard has ever before had to deliver. Because of the extreme conditions and lack of coastal infrastructure, this oversight will require specialized vessels—specifically, Arctic-ready icebreakers. Yet while other Arctic nations—including Russia, Sweden, and Canada—operate many of these powerful, armored ships,[7] the United States currently has just one functional heavy icebreaker, the U.S. Coast Guard Cutter Polar Star, capable of navigating throughout the Arctic year round.[8] Built in 1976, and already past its originally planned service life, this ship is only expected to function for a few more years.[9] The Coast Guard's other polar-capable vessel, the medium icebreaker Healy, has less icebreaking capacity, and is designed primarily for scientific research.[10]

FIGURE 1
Whose Arctic?

Government-owned, Arctic-capable icebreakers, operational or under construction as of June 2014



Note: Icebreaker rating is based on engine power. Heavy ships feature greater than 45,000 brake horse power, or BHP; medium ships feature 20,000–45,000 BHP; and light ships feature 10,000 - 20,000 BHP.

Source: United States Coast Guard Office of Waterways and Ocean Policy, *Major Icebreakers of the World* (U.S. Department of Homeland Security, 2014), available at http://www.uscg.mil/hq/cg5/cg552/images/20140626%20Major%20Icebreakers%20Chart.pdf.

Unless Congress and President Barack Obama act decisively to authorize and fund construction of new, modern icebreakers for the Coast Guard, the United States risks losing its capability to patrol the Arctic at the moment when such a capability is more important than ever. As Rep. Don Young (R-AK) explained, "Without access to heavy icebreakers, we will be unable to adapt to historic changes in the Arctic."[11]

Why a warming Arctic needs U.S. icebreakers

According to a congressionally ordered independent analysis,[12] 9 of the Coast Guard's 11 statutorily mandated missions[13] are now relevant to the rapidly thawing Arctic. These essential duties include enforcing fishing and maritime safety laws, maintaining defense readiness, and conducting search and rescue for mariners in distress.[14] The Coast Guard is also responsible for emergency response to offshore oil spills,[15] a particularly crucial function as the U.S. Department of the Interior prepares for new Arctic oil lease sales in 2020 and 2022[16] and as Royal Dutch Shell continues its pursuit of year-round, offshore oil and gas production in the Beaufort and Chukchi seas.[17] In other words, the Coast Guard must be able to conduct operations in Arctic waters in order to uphold its duties as both a military service and the foremost maritime law enforcement entity.

The paradox of the global warming-driven thaw of the Arctic is that the retreat of permanent sea ice is actually making Arctic navigation riskier, even as overall accessibility increases.[18] Before perennial sea ice began its steady retreat in the early 1980s,[19] it shielded Arctic waters from wind and reduced the volatility of seasonal ice formation.[20] Today, winter sea ice now forms and recedes over a much larger proportion of the Arctic Ocean. In addition, loose icebergs and pack ice can be quickly transported long distances and jam into thick ridges and treacherous, hull-crushing floes by wind and currents, especially in the spring and fall.[21]

To safely and effectively carry out its diverse missions in the Arctic year round, the Coast Guard must be properly equipped with specialized ships built with the powerful engines, structural reinforcement, and nearly two-inch thick steel hulls needed to withstand and break through even the thickest sea ice during the heart of the polar winter. Such ships, known as heavy icebreakers, are also large enough to accommodate aircraft, large crews of sailors, scientists and other personnel, as well as the storage of adequate fuel, supplies, and equipment required for self-supported polar missions and unaided journeys to and from the polar regions.[22]

Today, however, the United States only has one functional heavy icebreaker remaining—the U.S. Coast Guard Cutter Polar Star—and it's on its last legs. Commissioned in 1976 and originally slated for a 30-year service life, Congress provided about $57 million in fiscal years 2009 and 2010 for major repairs to the ship, which facilitated a successful re-launch in 2012.[23] The Coast Guard now expects the ship to function until around 2020, after which the United States will not have heavy icebreaking capability.[24]

Polar Star's sister ship, Polar Sea—commissioned in 1977—currently sits disabled and docked in the Port of Seattle, inoperable since a major engine failure in 2010.[25] Legislation signed by President Obama in December 2014 requires that the Coast Guard evaluate options for Polar Sea and decide to either decommission or attempt to rehabilitate the vessel.[26] However, should the latter option even prove to be feasible, a short extension of its service life similar to that of Polar Star seems like the best potential outcome. After this extension, the U.S. government would again not possess the capability for year-round operations in the Arctic.

According to the Congressional Research Service, the U.S. Department of Homeland Security, or DHS, made this predicament perfectly clear in its 2013 Mission Need Statement, in which it explained:

> *[C]urrent requirements and future projections... indicate the Coast Guard will need to expand its icebreaking capacity, potentially requiring a fleet of up to six icebreakers (3 heavy and 3 medium) to adequately meet mission demands in the high latitudes.*[27]

Two current issues—environmental security and national security—underscore this strategic outlook and are discussed in the following sections.

Oil spills on ice: Preparing for the risks of year-round Arctic oil production

"We are minded to drill this year in the Chukchi," Shell CEO Ben van Beurden told reporters on a January 29, 2015 earnings call.[28] He reinforced his point with a commitment to spend $1 billion on the effort this year, on top of the $6 billion Shell has already spent on its current Arctic campaign. This resoluteness comes despite a disastrous 2012 exploratory drilling campaign that called into question the company's competence to operate safely in Arctic conditions. That year, Shell's legally required oil spill containment unit was "crushed like a beer can" during tests in the calm waters of the Puget Sound;[29] its drilling contractor committed eight felony violations of maritime safety and water pollution laws, resulting in $12.2 million in federal fines;[30] and, at the season's end, Shell's 250-foot-tall, customized drill rig Kulluk ended up aground after its contractor attempted to tow it through gale force winds and 25-foot swell[31] in a mad dash across December seas in order to avoid tax liability to the state of Alaska.[32] Coast Guard officers led the coordinated response to the multi-day emergency, and its Alaska-based aviators saved the Kulluk's 18 crewmembers in a harrowing rescue operation, effectively preventing the crisis from becoming a tragedy.[33]

Hopefully, Shell will be better prepared and more judicious in its next Arctic foray than it was in 2012. But the human error, system failures, and life-threatening emergencies that stymied the oil company—one of the world's richest and most experienced—demonstrate the critical necessity of sustained Coast Guard presence in a region with truly humbling working conditions. Once the company has located ideal well sites, it will reportedly take 7 to 10 years to build permanent offshore platforms and other infrastructure needed to produce oil year round,[34] at which point both Shell and the Coast Guard must be prepared to conduct emergency and oil spill response year round, including in the ice-bound Arctic winter.

Yet Polar Star, already on an unplanned service-life extension, will likely not last longer than 7 to 10 years, and Polar Sea's potential reactivation remains uncertain. Meanwhile, the construction of a new heavy icebreaker could take as long as 10 years, as U.S. shipyards have not built such a vessel since launching the two Polar-class vessels nearly 40 years ago.[35]

Coast Guard presence in the Arctic is indispensable in ensuring the safety of offshore Arctic oil and gas production and to mitigate the worst impacts of any potential accident. Recall that in 2010, 60 Coast Guard vessels and 22 of its aircraft were deployed in the response to BP's Deepwater Horizon oil spill in the Gulf of Mexico.[36] Yet the U.S. government and the Coast Guard are fast approaching a major gap in Arctic capability, one that would force the mariners, ocean-dependent communities, and ecosystems of the Alaskan Arctic to simply wait until summer for help should they face an oil spill in winter.

Heavy icebreakers are crucial for national security

Heavy icebreakers are also essential assets for national security in the Arctic and to uphold U.S. sovereignty in our polar seas. In its "Naval Operations Concept" report—which coordinates the U.S. military's maritime assets with national security imperatives—the U.S. Navy makes clear that it depends exclusively on the Coast Guard for icebreaking capability should it need to move warships through ice.[37] Additionally, the report echoes calls from the DHS and independent analysts for sustained Coast Guard presence in the polar sea, stating, "Increased international activity, new transoceanic shipping routes and competition for resources in the Polar Regions will require icebreakers for the foreseeable future."[38]

While the possibility of an armed standoff in the Arctic seems remote, Russia—which has a fleet of 14 government-owned, Arctic-capable icebreakers with 3 more under construction as of June, 2014[39]—has recently carried out repeated incursions into the sovereign territories of several nations, including Finland[40] and the Baltic states, in addition to its occupation and annexation of Ukrainian territory.[41] Russia is also suspected of recent, mysterious submarine incursions into Swedish[42] and British[43] waters. As surprise contraventions of the international norms that enshrine territorial borders, these incidents left each country scrambling to marshal its defenses. Given the United States' looming inability to sustain a year-round military presence in the Arctic, those same international norms will represent much of its defense of Arctic maritime territory.

Today, defense experts in Sweden[44] and the United Kingdom[45] are bemoaning their respective countries' underinvestment in maritime security assets as a key factor in the vulnerability that these incursions have revealed. Other nations with a stake in the Arctic appear to recognize the importance of investment in polar-capable icebreakers: Canada has six government-owned vessels of the class, and Sweden, Germany, and Japan each have one.[46] Even China, a country with no polar territory of its own, has a modern icebreaker and a second one due to launch in 2016.[47]

The U.S. Navy is the most powerful the world has ever known.[48] Should it need to defend American interests in the Arctic Ocean, however, it will depend on the Coast Guard for safe passage through the ice. Yet without decisive action from appropriators, both branches of the military may soon be confined to warmer waters.

Finding the funding

While the necessity for additional U.S. icebreaking capacity is clear, the source of funding for it is not. According to independent analysis conducted for the Coast Guard, each new heavy icebreaker will cost almost $1 billion.[49] This is almost equivalent to the Coast Guard's entire 2016 budget request for acquisition, $1.01 billion, which must cover everything from modernizing its aged fleet of cutters and aircraft to maintaining bases and navigational aids.[50] This funding is already stretched too thin:

Decades-old vessels are still in operation, despite dire reliability issues that directly impinge on the fulfillment of essential duties such as search and rescue and drug interdiction throughout U.S. waters.[51] The Coast Guard cannot further shortchange missions in one region to pay for others elsewhere.

Over the long term, the major components of solving this challenge include boosting the Coast Guard's annual appropriations so that it can procure and deploy the vessels it needs and relocating its budget in a unified federal defense budget, as the Center for American Progress has advocated for several years.[52] This move would allow the costs and benefits associated with funding this underappreciated, hardworking branch of the armed services to be properly evaluated within the context of the overall defense budget—a much bigger pool of resources and an arena in which the necessary budgetary tradeoffs can be much more fairly considered.

The Coast Guard's entire FY 2014 budget of $10.4 billion[53] consumed a sizable 17 percent[54] of the DHS budget, but the same amount would comprise just 2.1 percent of the U.S. Defense Department's enacted FY 2014 budget[55] of $496 billion. Indeed, a single billion-dollar icebreaker would represent less than 5 percent of the $21 billion the Navy has proposed to spend on shipbuilding annually for the next thirty years.[56] Put in even starker contrast, the Coast Guard's entire 2014 budget was nearly matched by the $8.4 billion spent in 2014[57] for continued development of just one weapon under U.S. Department of Defense's stewardship—the years-delayed and budget-busting F-35 fighter jet.[58] The jet still has not been deemed ready for military operations despite a price tag that is now approaching $400 billion.[59]

Yet with the DHS's budget currently a partisan battlefield[60] for the 114th Congress due to the debate on immigration policy, legislation for these important structural reforms is probably not forthcoming. Meanwhile, the long lead time needed to procure Arctic-ready ships combined with the Arctic Ocean's continued thaw necessitates a more immediate and pragmatic approach.

The procurement process for the Coast Guard's research-oriented medium icebreaker—the USCGC Healy, commissioned in 1999[61]—provides a potential model for appropriators to consider today. In 1989, the 101st Congress allocated $329 million for procurement of the ship via a line item in the U.S. Navy's funding in the 1990 Defense Appropriations Act.[62] The Navy's shipbuilding command oversaw construction of the vessel, which was turned over to the Coast Guard upon completion.[63] A bipartisan group of senators that included Sens. Maria Cantwell (D-WA) and Lisa Murkowski (R-AK) attempted to replicate this accomplishment during the 113th Congress, introducing an amendment to the defense appropriations bill that would have funded the Navy to oversee the construction of four new icebreakers for the Coast Guard.[64] However, the amendment never advanced for a vote.

Today, the plurality and urgency of needs for the Coast Guard to sustain presence in the Arctic should unite a broad coalition of members of Congress, including advocates for the environment, scientific research, and offshore oil and gas production, as well as security hawks, and representatives of coastal states with an interest in upholding law and order along their seaboards and in their ports.

Pulling together funding from within the defense budget won't be easy, especially in the context of the discretionary defense spending caps established by the Budget Control Act of 2011. However, as discussed above, the cost of one to three heavy icebreakers is modest in comparison with other major weapons systems. Unlike the F-35's complex technological development process, the many decades of effective service provided by both Polar Star and Polar Sea, built on 1970s-era technology, suggests that new heavy icebreakers need not feature novel design elements that sometimes lead to budget overruns.

Nevertheless, the window of opportunity for action to ensure continuity in the U.S. military's Arctic capability is rapidly closing. Should icebreaker advocates not muster full congressional support in the upcoming Defense Department appropriations bill, a low-cost preliminary step should still be pursued. For example, Congress could authorize and fund the Coast Guard or the U.S. Navy's shipbuilding command to formulate a request for detailed design proposals for a heavy-icebreaker program from American shipbuilders that includes an option for procurement from the proposal evaluated to be the most competitive. Such processes are a normal feature of Navy acquisitions.[65] Furthermore, it would provide precise and concrete information to lawmakers and the shipyards interested in icebreaker construction on the costs involved.

Ensuring the Coast Guard is "Always Ready"

Just as the security and peace of any city depends on having police officers on the beat, Coast Guard presence is essential in carrying out vital missions in U.S. waters. What happens when nations fail to police and defend their exclusive economic zones? Indonesia—a country with a smaller naval budget than that of Singapore despite having around 55,000 km of coastline[66]—is estimated to lose as much as $3 billion per year worth of seafood to foreign pirate fishermen illegally plundering its waters.[67]

The U.S. government needs to start designing and building new heavy icebreakers to ensure that the Coast Guard retains capability to access the Artic and fulfill its missions in this region after Polar Star is decommissioned and before year-round Arctic oil and gas production begins. Should the needed appropriations be deferred yet again, President Obama and Congress risk undermining American credibility as an Arctic nation, and further eroding the identity of the stalwart maritime service that prides itself on being "Always Ready."[68]

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